ELEMENT WASHINGTON DC LLC
7185 Oakland Mills Road, Columbia, MD 21046 USA
Tel. 410.290.6652 / Fax 410.290.6654
http://www.element.com

PART 27 MEASUREMENT REPORT

Applicant Name:
Samsung Electronics Co., Ltd.
129, Samsung-ro,
Yeongtong-gu, Suwon-si
Gyeonggi-do, 16677, Korea

Date of Testing:
11/08/2023 - 12/29/2023
Test Report Issue Date:
12/29/2023
Test Site/Location:
Element lab., Columbia, MD, USA
Test Report Serial No.:
1M2311010111-05.A3L

FCC ID:	**A3LSMA356U**
Applicant Name:	**Samsung Electronics Co., Ltd.**

Application Type:	Certification
Model:	SM-A356U
Additional Model(s):	SM-A356U1, SM-S356V
EUT Type:	Portable Handset
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part:	27
Test Procedure(s):	ANSI C63.26-2015, KDB 648474 D03 v01r04

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in §2.947. Test results reported herein relate only to the item(s) tested.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

RJ Ortanez
Executive Vice President

ACCREDITED
CERT #2041.01

TABLE OF CONTENTS

PART 27 MEASUREMENT REPORT

Antenna-1						
Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
LTE Band 30	10 MHz	QPSK	2310.0	0.126	21.01	9M06G7D
		16QAM	2310.0	0.109	20.38	9M09W7D
	5 MHz	QPSK	2307.5 - 2312.5	0.135	21.32	4M56G7D
		16QAM	2307.5 - 2312.5	0.114	20.58	4M56W7D
LTE Band 7	20 MHz	QPSK	2510.0 - 2560.0	0.162	22.09	18M0G7D
		16QAM	2510.0 - 2560.0	0.140	21.46	18M0W7D
	15 MHz	QPSK	2507.5 - 2562.5	0.170	22.30	13M5G7D
		16QAM	2507.5 - 2562.5	0.135	21.30	13M5W7D
	10 MHz	QPSK	2505.0 - 2565.0	0.157	21.95	9M03G7D
		16QAM	2505.0 - 2565.0	0.134	21.26	9M04W7D
	5 MHz	QPSK	2502.5 - 2567.5	0.164	22.15	4M53G7D
		16QAM	2502.5 - 2567.5	0.141	21.48	4M52W7D
LTE Band 41(PC2)	20 MHz	QPSK	2506.0 - 2680.0	0.332	25.21	18M0G7D
		16QAM	2506.0 - 2680.0	0.289	24.60	17M9W7D
	15 MHz	QPSK	2503.5 - 2682.5	0.350	25.44	13M5G7D
		16QAM	2503.5 - 2682.5	0.360	25.56	13M5W7D
	10 MHz	QPSK	2501.0 - 2685.0	0.334	25.23	9M06G7D
		16QAM	2501.0 - 2685.0	0.292	24.65	9M00W7D
	5 MHz	QPSK	2498.5 - 2687.5	0.357	25.52	4M54G7D
		16QAM	2498.5 - 2687.5	0.317	25.00	4M51W7D
LTE Band 38	20 MHz	QPSK	2506.0 - 2680.0	0.235	23.71	18M0G7D
		16QAM	2506.0 - 2680.0	0.191	22.80	18M0W7D
	15 MHz	QPSK	2503.5 - 2682.5	0.240	23.80	13M5G7D
		16QAM	2503.5 - 2682.5	0.188	22.73	13M5W7D
	10 MHz	QPSK	2501.0 - 2685.0	0.235	23.71	9M04G7D
		16QAM	2501.0 - 2685.0	0.186	22.69	9M02W7D
	5 MHz	QPSK	2498.5 - 2687.5	0.240	23.80	4M52G7D
		16QAM	2498.5 - 2687.5	0.188	22.74	4M50W7D

Antenna-1						
Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
NR Band n30	10 MHz	π/2 BPSK	2310.0	0.122	20.86	9M05G7D
		QPSK	2310.0	0.125	20.98	9M37G7D
		16QAM	2310.0	0.095	19.77	9M35W7D
	5 MHz	π/2 BPSK	2307.5 - 2312.5	0.126	21.01	4M56G7D
		QPSK	2307.5 - 2312.5	0.128	21.08	4M54G7D
		16QAM	2307.5 - 2312.5	0.102	20.08	4M53W7D
NR Band n41(PC2)	100 MHz	π/2 BPSK	2546.0 - 2640.0	0.246	23.90	97M0G7D
		QPSK	2546.0 - 2640.0	0.250	23.98	97M8G7D
		16QAM	2546.0 - 2640.0	0.211	23.24	97M7W7D
	90 MHz	π/2 BPSK	2541.0 - 2645.0	0.246	23.90	87M2G7D
		QPSK	2541.0 - 2645.0	0.251	23.99	87M7G7D
		16QAM	2541.0 - 2645.0	0.207	23.16	88M0W7D
	80 MHz	π/2 BPSK	2536.0 - 2650.0	0.237	23.75	77M5G7D
		QPSK	2536.0 - 2650.0	0.238	23.77	77M8G7D
		16QAM	2536.0 - 2650.0	0.199	22.99	77M9W7D
	70 MHz	π/2 BPSK	2531.0 - 2655.0	0.233	23.67	64M6G7D
		QPSK	2531.0 - 2655.0	0.244	23.88	67M8G7D
		16QAM	2531.0 - 2655.0	0.201	23.04	67M7W7D
	60 MHz	π/2 BPSK	2526.0 - 2660.0	0.224	23.50	58M4G7D
		QPSK	2526.0 - 2660.0	0.232	23.65	58M3G7D
		16QAM	2526.0 - 2660.0	0.191	22.81	58M2W7D
	50 MHz	π/2 BPSK	2521.0 - 2665.0	0.232	23.65	46M1G7D
		QPSK	2521.0 - 2665.0	0.233	23.68	47M9G7D
		16QAM	2521.0 - 2665.0	0.191	22.80	47M7W7D
	40 MHz	π/2 BPSK	2516.0 - 2670.0	0.227	23.55	36M0G7D
		QPSK	2516.0 - 2670.0	0.233	23.67	38M1G7D
		16QAM	2516.0 - 2670.0	0.195	22.91	38M1W7D
	30 MHz	π/2 BPSK	2511.0 - 2675.0	0.228	23.57	27M0G7D
		QPSK	2511.0 - 2675.0	0.237	23.74	28M0G7D
		16QAM	2511.0 - 2675.0	0.196	22.93	28M0W7D
	20 MHz	π/2 BPSK	2506.0 - 2680.0	0.226	23.55	18M0G7D
		QPSK	2506.0 - 2680.0	0.233	23.67	18M3G7D
		16QAM	2506.0 - 2680.0	0.195	22.91	18M4W7D
	15 MHz	π/2 BPSK	2506.0 - 2680.0	0.228	23.57	13M0W7D
		QPSK	2506.0 - 2680.0	0.233	23.67	13M7W7D
		16QAM	2506.0 - 2680.0	0.191	22.80	13M7W7D
	10 MHz	π/2 BPSK	2506.0 - 2680.0	0.227	23.55	8M69W7D
		QPSK	2506.0 - 2680.0	0.232	23.66	8M74W7D
		16QAM	2506.0 - 2680.0	0.197	22.94	8M66W7D

Antenna-2						
Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
LTE Band 30	10 MHz	QPSK	2310.0	0.078	18.94	9M07G7D
		16QAM	2310.0	0.066	18.20	9M06W7D
	5 MHz	QPSK	2307.5 - 2312.5	0.085	19.30	4M55G7D
		16QAM	2307.5 - 2312.5	0.070	18.42	4M55W7D
LTE Band 7	20 MHz	QPSK	2510.0 - 2560.0	0.076	18.79	18M0G7D
		16QAM	2510.0 - 2560.0	0.064	18.05	17M9W7D
	15 MHz	QPSK	2507.5 - 2562.5	0.076	18.81	13M5G7D
		16QAM	2507.5 - 2562.5	0.068	18.30	13M5W7D
	10 MHz	QPSK	2505.0 - 2565.0	0.077	18.86	9M03G7D
		16QAM	2505.0 - 2565.0	0.065	18.10	9M05W7D
	5 MHz	QPSK	2502.5 - 2567.5	0.079	18.96	4M55G7D
		16QAM	2502.5 - 2567.5	0.064	18.09	4M53W7D
LTE Band 41(PC2)	20 MHz	QPSK	2506.0 - 2680.0	0.147	21.66	18M0G7D
		16QAM	2506.0 - 2680.0	0.131	21.18	17M9W7D
	15 MHz	QPSK	2503.5 - 2682.5	0.144	21.59	13M5G7D
		16QAM	2503.5 - 2682.5	0.125	20.97	13M5W7D
	10 MHz	QPSK	2501.0 - 2685.0	0.145	21.62	8M95G7D
		16QAM	2501.0 - 2685.0	0.133	21.25	8M97W7D
	5 MHz	QPSK	2498.5 - 2687.5	0.144	21.57	4M50G7D
		16QAM	2498.5 - 2687.5	0.131	21.16	4M52W7D
LTE Band 38	20 MHz	QPSK	2506.0 - 2680.0	0.070	18.48	17M9G7D
		16QAM	2506.0 - 2680.0	0.063	18.00	18M0W7D
	15 MHz	QPSK	2503.5 - 2682.5	0.069	18.40	13M5G7D
		16QAM	2503.5 - 2682.5	0.063	17.98	13M5W7D
	10 MHz	QPSK	2501.0 - 2685.0	0.070	18.45	9M02G7D
		16QAM	2501.0 - 2685.0	0.063	17.96	9M01W7D
	5 MHz	QPSK	2498.5 - 2687.5	0.070	18.42	4M55G7D
		16QAM	2498.5 - 2687.5	0.064	18.04	4M52W7D

Antenna-2						
Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
NR Band n30	10 MHz	π/2 BPSK	2310.0	0.073	18.62	9M05G7D
		QPSK	2310.0	0.072	18.60	9M42G7D
		16QAM	2310.0	0.044	16.48	9M40W7D
	5 MHz	π/2 BPSK	2307.5 - 2312.5	0.073	18.65	4M54G7D
		QPSK	2307.5 - 2312.5	0.074	18.66	4M60G7D
		16QAM	2307.5 - 2312.5	0.047	16.72	4M56W7D

Antenna-2						
Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
NR Band n41(PC2)	100 MHz	π/2 BPSK	2546.0 - 2640.0	0.162	22.08	97M2G7D
		QPSK	2546.0 - 2640.0	0.160	22.03	98M3G7D
		16QAM	2546.0 - 2640.0	0.126	21.01	98M2W7D
	90 MHz	π/2 BPSK	2541.0 - 2645.0	0.162	22.10	87M6G7D
		QPSK	2541.0 - 2645.0	0.161	22.06	88M4G7D
		16QAM	2541.0 - 2645.0	0.128	21.06	88M3W7D
	80 MHz	π/2 BPSK	2536.0 - 2650.0	0.163	22.11	78M0G7D
		QPSK	2536.0 - 2650.0	0.161	22.06	78M2G7D
		16QAM	2536.0 - 2650.0	0.133	21.23	78M3W7D
	70 MHz	π/2 BPSK	2531.0 - 2655.0	0.169	22.27	65M0G7D
		QPSK	2531.0 - 2655.0	0.162	22.10	68M1G7D
		16QAM	2531.0 - 2655.0	0.134	21.28	67M9W7D
	60 MHz	π/2 BPSK	2526.0 - 2660.0	0.169	22.27	58M7G7D
		QPSK	2526.0 - 2660.0	0.162	22.10	58M5G7D
		16QAM	2526.0 - 2660.0	0.134	21.28	58M6W7D
	50 MHz	π/2 BPSK	2521.0 - 2665.0	0.166	22.19	46M2G7D
		QPSK	2521.0 - 2665.0	0.163	22.11	47M9G7D
		16QAM	2521.0 - 2665.0	0.134	21.26	47M8W7D
	40 MHz	π/2 BPSK	2516.0 - 2670.0	0.164	22.15	36M0G7D
		QPSK	2516.0 - 2670.0	0.162	22.08	38M2G7D
		16QAM	2516.0 - 2670.0	0.131	21.16	38M2W7D
	30 MHz	π/2 BPSK	2511.0 - 2675.0	0.167	22.23	27M1G7D
		QPSK	2511.0 - 2675.0	0.161	22.07	28M1G7D
		16QAM	2511.0 - 2675.0	0.128	21.08	28M0W7D
	20 MHz	π/2 BPSK	2506.0 - 2680.0	0.164	22.15	18M1G7D
		QPSK	2506.0 - 2680.0	0.139	21.42	18M4G7D
		16QAM	2506.0 - 2680.0	0.130	21.15	18M4W7D
	15 MHz	π/2 BPSK	2506.0 - 2680.0	0.162	22.1	13M0W7D
		QPSK	2506.0 - 2680.0	0.158	21.98	13M7W7D
		16QAM	2506.0 - 2680.0	0.129	21.11	13M7W7D
	10 MHz	π/2 BPSK	2506.0 - 2680.0	0.159	22.02	8M68W7D
		QPSK	2506.0 - 2680.0	0.156	21.93	8M70W7D
		16QAM	2506.0 - 2680.0	0.130	21.14	8M66W7D

1.0 INTRODUCTION

1.1 Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Innovation, Science and Economic Development Canada.

1.2 Element Test Location

These measurement tests were conducted at the Element laboratory located at 7185 Oakland Mills Road, Columbia, MD 21046. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014.

1.3 Test Facility / Accreditations

Measurements were performed at Element lab located in Columbia, MD 21046, U.S.A.

- Element Washington DC LLC is an ISO 17025-2017 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.

- Element Washington DC LLC TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISED Standards (RSS).

- Element Washington DC LLC facility is a registered (2451B) test laboratory with the site description on file with ISED.

- Element Washington DC LLC is a Recognized U.S. Certification Assessment Body (CAB # US0110) for ISED Canada as designated by NIST under the U.S. and Canada Mutual Recognition Agreement.

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMA356U**. The test data contained in this report pertains only to the emissions due to the EUT's licensed transmitters that operate under the provisions of Part 27.

Test Device Serial No.: 3425M, 3383M, 3596M, 3698M, 2807M, 3653M, 3597M

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, Multi-band 5G NR (FR1), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII (5GHz), Bluetooth (1x, EDR, LE), NFC

Band	Ant 1	Ant 2
B30	Ant B	Ant F
B7	Ant B	Ant F
B41 PC2	Ant B	Ant F
B38	Ant B	Ant F
n30	Ant B	Ant F
n41 PC2	Ant B	Ant F

Table 2-1. Antenna Naming Convention

2.3 Test Configuration

The EUT was tested per the guidance of ANSI C63.26-2015. See Section 7.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

2.4 Software and Firmware

Testing was performed on device(s) using software/firmware version A356USQU0AWJ2 installed on the EUT.

2.5 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and no modifications were made during testing.

3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

The measurement procedures described in the "American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services" (ANSI C63.26-2015) were used in the measurement of the EUT**.**

Deviation from Measurement Procedure……..None

3.2 Radiated Power and Radiated Spurious Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Figure 5.7 of Clause 5 in ANSI C63.4-2014. Absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections for measurements above 1GHz. For measurements below 1GHz, the absorbers are removed. A raised turntable is used for radiated measurement. The turn table is a continuously rotatable, remote-controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm tall test table made of Styrodur is placed on top of the turn table. A Styrodur pedestal is placed on top of the test table to bring the total table height to 1.5m.

The equipment under test was transmitting while connected to its integral antenna and is placed on a turntable 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer.

For radiated power measurements, substitution method is used per the guidance of ANSI C63.26-2015. For emissions below 1GHz, a half-wave dipole is substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

$$P_{d\ [dBm]} = P_{g\ [dBm]} - \text{cable loss}_{\ [dB]} + \text{antenna gain}_{\ [dBd/dBi]};$$

where P_d is the dipole equivalent power, P_g is the generator output into the substitution antenna, and the antenna gain is the gain of the substitute antenna used relative to either a half-wave dipole (dBd) or an isotropic source (dBi). The substitute level is equal to $P_{g\ [dBm]}$ – cable loss $_{[dB]}$.

For radiated spurious emissions measurements, the field strength conversion method is used per the formulas in Section 5.2.7 of ANSI C63.26-2015. Field Strength (EIRP) is calculated using the following formulas:

$$E_{[dB\mu V/m]} = \text{Measured amplitude level}_{[dBm]} + 107 + \text{Cable Loss}_{[dB]} + \text{Antenna Factor}_{[dB/m]}$$

And

$$EIRP_{[dBm]} = E_{[dB\mu V/m]} + 20\log D - 104.8;$$ where D is the measurement distance in meters.

All radiated measurements are performed in a chamber that meets the site requirements per ANSI C63.4-2014. Additionally, radiated emissions below 30MHz are also validated on an Open Area Test Site to assert correlation with the chamber measurements per the requirements of KDB 414788 D01 v01r01.

Radiated power and radiated spurious emission levels are investigated with the receive antenna horizontally and vertically polarized per ANSI C63.26-2015.

4.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4-2014. All measurement uncertainty values are shown with a coverage factor of k = 2 to indicate a 95% level of confidence. The measurement uncertainty shown below meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Contribution	Expanded Uncertainty (±dB)
Conducted Bench Top Measurements	1.13
Radiated Disturbance (<1GHz)	4.98
Radiated Disturbance (>1GHz)	5.07
Radiated Disturbance (>18GHz)	5.09

5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurements antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2017.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	AP2-001	EMC Cable and Switch System	1/11/2023	Annual	1/11/2024	AP2-001
-	AP2-002	EMC Cable and Switch System	1/11/2023	Annual	1/11/2024	AP2-002
-	ETS-001	EMC Cable and Switch System	1/11/2023	Annual	1/11/2024	ETS-001
-	ETS-002	EMC Cable and Switch System	1/11/2023	Annual	1/11/2024	ETS-002
-	LTX4	Licensed Transmitter Cable Set	1/12/2023	Annual	1/12/2024	LTX4
-	LTX5	Licensed Transmitter Cable Set	1/12/2023	Annual	1/12/2024	LTX5
Anritsu	MT8821C	Radio Communication Analyzer	N/A			620152694
Com-Power	AL-130R	9kHz - 30MHz Loop Antenna	1/18/2022	Biennial	1/19/2024	121085
EMCO	3115	Horn Antenna (1-18GHz)	8/8/2022	Biennial	8/8/2024	9704-5182
EMCO	3116	Horn Antenna (18-40GHz)	7/5/2023	Biennial	7/5/2025	9203-2178
Keysight Technologies	N9030A	PXA Signal Analyzer (3Hz-26.5GHz)	8/7/2023	Annual	8/7/2024	MY54490576
Keysight Technologies	N9030A	PXA Signal Analyzer (44GHz)	3/15/2023	Annual	3/15/2024	MY52350166
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			112347
Rohde & Schwarz	TC-TA18	Cross Polarized Vivaldi Test Antenna	9/28/2022	Biennial	9/28/2024	101058
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	9/25/2023	Annual	9/25/2024	100342
Rohde & Schwarz	ESW44	EMI Test Receiver (2Hz-44GHz)	3/1/2023	Annual	3/1/2024	101716
Rohde & Schwarz	VULB9162	Bi-Log Antenna	2/21/2023	Biennial	2/21/2025	00301
Sunol	DRH-118	Horn Antenna (1-18GHz)	2/14/2022	Biennial	2/14/2024	A050307
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	8/30/2022	Biennial	8/30/2024	A051107

Table 5-1. Test Equipment

Notes:

1. For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.

2. Equipment with a calibration date of “N/A” shown in this list was not used to make direct calibrated measurements.

6.0 SAMPLE CALCULATIONS

QPSK Modulation

Emission Designator = 8M62G7D
LTE BW = 8.62 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data transmission, telemetry, telecommand

QAM Modulation

Emission Designator = 8M45W7D
LTE BW = 8.45 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Data transmission, telemetry, telecommand

Spurious Radiated Emission

Example: Spurious emission at 3700.40 MHz

The receive spectrum analyzer reading at 3 meters with the EUT on the turntable was –81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of –81.0 dBm on the spectrum analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 3700.40 MHz. So 6.1 dB is added to the signal generator reading of –30.9 dBm yielding –24.80 dBm. The fundamental EIRP was 25.50 dBm so this harmonic was 25.50 dBm – (-24.80) = 50.3 dBc.

7.0 TEST RESULTS

7.1 Summary

Company Name: Samsung Electronics Co., Ltd.

FCC ID: A3LSMA356U

FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)

Mode(s): LTE/NR/ULCA

Test Condition	Test Description	FCC Part Section(s)	Test Limit	Test Result	Reference
CONDUCTED	Transmitter Conducted Output Power*	2.1046(a), 2.1046(c)	N/A	PASS	Section 7.2
	Occupied Bandwidth	2.1049(h)	N/A	PASS	Section 7.3
	Conducted Band Edge / Spurious Emissions (LTE Band 30; NR Band n30)	2.1051, 27.53(a)(4)	Undesirable emissions must meet the limits detailed in 27.53(a)(4)	PASS	Sections 7.4, 7.5
	Conducted Band Edge / Spurious Emissions (LTE Band 7, 38, 41; NR Band n7, n38, n41)	2.1051, 27.53(m)(4)	Undesirable emissions must meet the limits detailed in 27.53(m)(4)	PASS	Sections 7.4, 7.5
	Frequency Stability	2.1055, 27.54	Fundamental emissions stay within authorized frequency block	PASS	Section 7.8
RADIATED	Equivalent Isotropic Radiated Power (LTE Band 30; NR Band n30)	27.50(a)(3)	≤ 250mW / 5MHz max. EIRP	PASS	Section 7.6
	Equivalent Isotropic Radiated Power (LTE Band 7, 38, 41; NR Band n7, n38, n41)	27.50(h)(2)	≤ 2 Watts max. EIRP	PASS	Section 7.6
	Radiated Spurious Emissions (LTE Band 30; NR Band n30)	2.1053, 27.53(a)(4)	Undesirable emissions must meet the limits detailed in 27.53(a)(4)	PASS	Section 7.7
	Radiated Spurious Emissions (LTE Band 7, 38, 41; NR Band n7, n38, n41)	2.1053, 27.53(m)	Undesirable emissions must meet the limits detailed in 27.53(m)	PASS	Section 7.7

* The only transmitter output conducted powers included in this report are those where the Pmax value, per the tune-up document, is higher than any of the DSI power levels. For the remaining conducted power measurements, see the **RF Exposure Report**.

Table 7-1. Summary of Test Results

Notes:

1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
2) The analyzer plots were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
4) All conducted emissions measurements are performed with automated test software to capture the corresponding plots necessary to show compliance. The measurement software utilized is EMC Software Tool v1.2.2.

7.2 Conducted Output Power Data

Test Overview

All emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst-case configuration. All modes of operation were investigated and the worst-case configuration results are reported in this section.

A-MPR is implemented in this device when operating at Power Class 2 in LTE Band 41 per the A-MPR specification in 3GPP TS 36.101. The conducted powers are shown herein to cover the different A-MPR levels specified in the standard. Measurement equipment was set up with triggering/gating on the spectrum analyzer such that powers were measured only during the on-time of the signal.

Test Procedure Used

ANSI C63.26-2015 – Section 5.2

Test Settings

1. Span = 2 x OBW to 3 x OBW
2. Detector = RMS
3. Trace mode = trace average for continuous emissions, max hold for pulse emissions
4. Sweep time = auto couple
5. The trace was allowed to stabilize
6. Please see test notes below for RBW and VBW settings

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

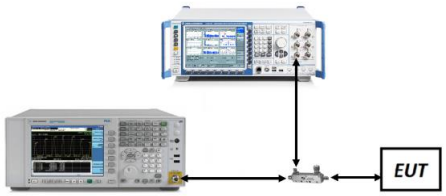


Figure 7-1. Test Instrument & Measurement Setup

Test Notes

1. Conducted power measurements were evaluated using various combinations of RB size, RB offset, modulation, and channel bandwidth. Channel bandwidth data is shown in the tables below based only on the channel bandwidths that were supported in this device.

2. All other conducted power measurements are contained in the RF exposure report for this filing.

3. Conducted power was found to reduce for the higher order QAM modulations when compared to 16QAM. Due to this trend, only the worst-case QAM (16QAM) powers are included in this section.

Power State	Band	Bandwidth (PCC + SCC)	PCC					SCC					ULCA Tx. Power [dBm]
			Modulation	UL Channel	UL Frequency	UL # RB	UL RB Offset	Modulation	UL Channel	UL Frequency	UL # RB	UL RB Offset	
Max	LTE B41 (PC2)	20MHz + 20MHz	QPSK	39750	2506.0	1	99	QPSK	39948	2525.8	1	0	22.94
				40620	2593.0	1	99		40818	2612.8	1	0	24.21
				41490	2680.0	1	0		41292	2660.2	1	99	24.1
			QPSK	40620	2593	100	0	QPSK	40818	2612.8	100	0	24.22
			16-QAM	40620	2593	100	0	16-QAM	40818	2612.8	100	0	24.21
			64-QAM	40620	2593	100	0	64-QAM	40818	2612.8	100	0	24.23
			256-QAM	40620	2593	100	0	256-QAM	40818	2612.8	100	0	24.24

Table 7-1. Conducted Power Data (LTE Band 41(PC2) ULCA

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
10 MHz	QPSK	27710	2310.0	1 / 49	21.52
	16-QAM	27710	2310.0	1 / 25	20.72
5 MHz	QPSK	27685	2307.5	1 / 12	21.88
		27710	2310.0	1 / 12	21.68
		27735	2312.5	1 / 24	21.54
	16-QAM	27685	2307.5	1 / 12	20.94

Table 7-2. Conducted Power Data (LTE Band 30 – Ant2)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
20 MHz	QPSK	20850	2510.0	1 / 99	22.83
		21100	2535.0	1 / 50	22.89
		21350	2560.0	1 / 99	22.87
	16-QAM	21100	2535.0	1 / 99	22.11
15 MHz	QPSK	20825	2507.5	1 / 74	22.93
		21100	2535.0	1 / 74	22.91
		21375	2562.5	1 / 0	22.98
	16-QAM	21100	2535.0	1 / 74	22.36
10 MHz	QPSK	20800	2505.0	1 / 25	22.83
		21100	2535.0	1 / 49	22.96
		21400	2565.0	1 / 0	22.97
	16-QAM	21100	2535.0	1 / 25	22.17
5 MHz	QPSK	20775	2502.5	1 / 12	22.95
		21100	2535.0	1 / 0	22.76
		21425	2567.5	1 / 0	22.99
	16-QAM	21100	2535.0	1 / 0	22.15

Table 7-3. Conducted Power Data (LTE Band 7 – Ant2)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
20 MHz	QPSK	39750	2506.0	1 / 0	24.98
		40620	2593.0	1 / 0	24.78
		41490	2680.0	1 / 0	25.24
	16-QAM	41490	2680.0	1 / 0	24.45
15 MHz	QPSK	39725	2503.5	1 / 0	25.02
		40620	2593.0	1 / 0	24.84
		41515	2682.5	1 / 0	25.17
	16-QAM	41515	2682.5	1 / 0	24.24
10 MHz	QPSK	39700	2501.0	1 / 25	25.01
		40620	2593.0	1 / 0	24.79
		41540	2685.0	1 / 0	25.20
	16-QAM	41540	2685.0	1 / 25	24.52
5 MHz	QPSK	39675	2498.5	1 / 24	25.05
		40620	2593.0	1 / 24	24.74
		41565	2687.5	1 / 24	25.15
	16-QAM	41565	2687.5	1 / 24	24.43

Table 7-4. Conducted Power Data (LTE Band 41(PC2) – Ant2)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
20 MHz	QPSK	37850	2580.0	1 / 0	22.12
		38000	2595.0	1 / 0	21.91
		38150	2610.0	1 / 0	22.32
	16-QAM	38150	2610.0	1 / 0	21.45
15 MHz	QPSK	37825	2577.5	1 / 0	22.10
		38000	2595.0	1 / 0	21.90
		38175	2612.5	1 / 0	22.26
	16-QAM	38175	2612.5	1 / 0	21.38
10 MHz	QPSK	37800	2575.0	1 / 0	22.15
		38000	2595.0	1 / 0	21.77
		38200	2615.0	1 / 0	22.31
	16-QAM	38200	2615.0	1 / 0	21.41
5 MHz	QPSK	37775	2572.5	1 / 12	22.17
		38000	2595.0	1 / 12	21.90
		38225	2617.5	1 / 0	22.28
	16-QAM	38225	2617.5	1 / 24	21.28

Table 7-5. Conducted Power Data (LTE Band 38 – Ant2)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
10 MHz	π/2 BPSK	27710	2310.0	1 / 26	22.16
	QPSK	27710	2310.0	1 / 26	21.97
	16-QAM	27710	2310.0	1 / 26	21.10
5 MHz	π/2 BPSK	27685	2307.5	1 / 12	22.14
		27710	2310.0	1 / 12	22.12
		27735	2312.5	1 / 12	22.10
	QPSK	27685	2307.5	1 / 12	22.08
		27710	2310.0	1 / 12	21.86
		27735	2312.5	1 / 12	22.11
	16-QAM	27685	2307.5	1 / 12	21.34

Table 7-6. Conducted Power Data (NR Band n30 – Ant2)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	π/2 BPSK	509202	2546.01	1 / 271	25.89
		518598	2592.99	1 / 136	26.16
		528000	2640.00	1 / 136	26.02
	QPSK	509202	2546.01	1 / 271	25.87
		518598	2592.99	1 / 136	26.18
		528000	2640.00	1 / 136	25.91
	16-QAM	509202	2546.01	1 / 271	24.90
90 MHz	π/2 BPSK	508200	2541.00	1 / 243	25.89
		518598	2592.99	1 / 122	26.17
		528996	2644.98	1 / 122	26.01
	QPSK	508200	2541.00	1 / 243	25.88
		518598	2592.99	1 / 122	26.06
		528996	2644.98	1 / 122	26.06
	16-QAM	508200	2541.00	1 / 243	24.82
80 MHz	π/2 BPSK	507204	2536.02	1 / 215	25.74
		518598	2592.99	1 / 108	26.18
		529998	2649.99	1 / 108	25.94
	QPSK	507204	2536.02	1 / 215	25.66
		518598	2592.99	1 / 108	26.08
		529998	2649.99	1 / 108	25.99
	16-QAM	507204	2536.02	1 / 215	24.65
70 MHz	π/2 BPSK	506202	2531.01	1 / 187	25.66
		518598	2592.99	1 / 94	26.15
		531000	2655.00	1 / 94	26.03
	QPSK	506202	2531.01	1 / 187	25.77
		518598	2592.99	1 / 94	26.09
		531000	2655.00	1 / 94	25.89
	16-QAM	506202	2531.01	1 / 187	24.70
60 MHz	π/2 BPSK	505200	2526.00	1 / 160	25.49
		518598	2592.99	1 / 81	26.19
		531996	2659.98	1 / 81	26.03
	QPSK	505200	2526.00	1 / 160	25.54
		518598	2592.99	1 / 81	26.17
		531996	2659.98	1 / 81	25.96
	16-QAM	505200	2526.00	1 / 160	24.47
50 MHz	π/2 BPSK	504204	2521.02	1 / 66	25.64
		518598	2592.99	1 / 66	26.13
		532998	2664.99	1 / 66	25.89
	QPSK	504204	2521.02	1 / 66	25.57
		518598	2592.99	1 / 66	26.04
		532998	2664.99	1 / 66	25.91
	16-QAM	504204	2521.02	1 / 66	24.46
40 MHz	π/2 BPSK	503202	2516.01	1 / 53	25.54
		518598	2592.99	1 / 53	26.18
		534000	2670.00	1 / 1	25.94
	QPSK	503202	2516.01	1 / 53	25.56
		518598	2592.99	1 / 53	26.12
		534000	2670.00	1 / 1	25.94
	16-QAM	503202	2516.01	1 / 53	24.57
30 MHz	π/2 BPSK	502200	2511.00	1 / 39	25.56
		518598	2592.99	1 / 39	26.18
		534996	2674.98	1 / 1	25.90
	QPSK	502200	2511.00	1 / 39	25.63
		518598	2592.99	1 / 39	26.14
		534996	2674.98	1 / 1	25.88
	16-QAM	502200	2511.00	1 / 39	24.59
20 MHz	π/2 BPSK	501204	2506.02	1 / 25	25.54
		518598	2592.99	1 / 25	26.18
		535998	2679.99	1 / 1	25.94
	QPSK	501204	2506.02	1 / 25	25.56
		518598	2592.99	1 / 25	26.12
		535998	2679.99	1 / 1	25.94
	16-QAM	501204	2506.02	1 / 25	24.57
15 MHz	π/2 BPSK	500700	2503.50	1/36	25.56
		518598	2592.99	1/19	26.15
		536496	2682.48	1/19	25.68
	QPSK	500700	2503.50	1/36	25.56
		518598	2592.99	1/19	26.14
		536496	2682.48	1/19	25.74
	16-QAM	500700	2503.50	1/36	24.46
10 MHz	π/2 BPSK	500202	2501.01	1/1	25.54
		518598	2592.99	1/12	26.16
		537000	2685.00	1/12	25.64
	QPSK	500202	2501.01	1/1	25.55
		518598	2592.99	1/12	26.12
		537000	2685.00	1/12	25.62
	16-QAM	500202	2501.01	1/1	24.60

Table 7-7. Conducted Power Data (NR Band n41 – Ant1)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	π/2 BPSK	509202	2546.01	1 / 1	24.35
		518598	2592.99	1 / 271	24.44
		528000	2640.00	1 / 136	24.53
	QPSK	509202	2546.01	1 / 1	24.31
		518598	2592.99	1 / 271	24.43
		528000	2640.00	1 / 136	24.57
	16-QAM	528000	2640.00	1 / 136	23.45
90 MHz	π/2 BPSK	508200	2541.00	1 / 1	24.23
		518598	2592.99	1 / 243	24.40
		528996	2644.98	1 / 122	24.55
	QPSK	508200	2541.00	1 / 1	24.25
		518598	2592.99	1 / 243	24.34
		528996	2644.98	1 / 122	24.60
	16-QAM	528996	2644.98	1 / 122	23.50
80 MHz	π/2 BPSK	507204	2536.02	1 / 1	24.28
		518598	2592.99	1 / 215	24.32
		529998	2649.99	1 / 108	24.56
	QPSK	507204	2536.02	1 / 1	24.35
		518598	2592.99	1 / 215	24.33
		529998	2649.99	1 / 108	24.60
	16-QAM	529998	2649.99	1 / 108	23.67
70 MHz	π/2 BPSK	506202	2531.01	1 / 1	24.28
		518598	2592.99	1 / 187	24.30
		531000	2655.00	1 / 94	24.68
	QPSK	506202	2531.01	1 / 1	24.23
		518598	2592.99	1 / 187	24.29
		531000	2655.00	1 / 94	24.61
	16-QAM	531000	2655.00	1 / 94	23.68
60 MHz	π/2 BPSK	505200	2526.00	1 / 1	24.32
		518598	2592.99	1 / 81	24.40
		531996	2659.98	1 / 81	24.72
	QPSK	505200	2526.00	1 / 1	24.28
		518598	2592.99	1 / 81	24.30
		531996	2659.98	1 / 81	24.64
	16-QAM	531996	2659.98	1 / 81	23.72
50 MHz	π/2 BPSK	504204	2521.02	1 / 1	24.36
		518598	2592.99	1 / 131	24.29
		532998	2664.99	1 / 66	24.64
	QPSK	504204	2521.02	1 / 1	24.36
		518598	2592.99	1 / 131	24.28
		532998	2664.99	1 / 66	24.65
	16-QAM	532998	2664.99	1 / 66	23.70
40 MHz	π/2 BPSK	503202	2516.01	1 / 1	24.37
		518598	2592.99	1 / 53	24.38
		534000	2670.00	1 / 53	24.60
	QPSK	503202	2516.01	1 / 1	24.30
		518598	2592.99	1 / 53	24.37
		534000	2670.00	1 / 53	24.62
	16-QAM	534000	2670.00	1 / 53	23.60
30 MHz	π/2 BPSK	502200	2511.00	1 / 1	24.39
		518598	2592.99	1 / 39	24.38
		534996	2674.98	1 / 39	24.68
	QPSK	502200	2511.00	1 / 1	24.39
		518598	2592.99	1 / 39	24.37
		534996	2674.98	1 / 39	24.61
	16-QAM	534996	2674.98	1 / 39	23.52
20 MHz	π/2 BPSK	501204	2506.02	1 / 1	24.38
		518598	2592.99	1 / 49	24.31
		535998	2679.99	1 / 1	24.60
	QPSK	501204	2506.02	1 / 1	24.41
		518598	2592.99	1 / 49	24.32
		535998	2679.99	1 / 1	24.59
	16-QAM	535998	2679.99	1 / 1	23.59
15 MHz	π/2 BPSK	500700	2503.50	1/19	24.41
		518598	2592.99	1/36	24.32
		536496	2682.48	1/1	24.55
	QPSK	500700	2503.50	1/19	24.37
		518598	2592.99	1/36	24.29
		536496	2682.48	1/1	24.52
	16-QAM	536496	2682.48	1/11	23.55
10 MHz	π/2 BPSK	500202	2501.01	1/1	24.40
		518598	2592.99	1/22	24.30
		537000	2685.00	1/12	24.47
	QPSK	500202	2501.01	1/1	24.40
		518598	2592.99	1/22	24.28
		537000	2685.00	1/12	24.47
	16-QAM	537000	2685.00	1/12	23.58

Table 7-8. Conducted Power Data (NR Band n41 – Ant2)

7.3 Occupied Bandwidth

Test Overview

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. All modes of operation were investigated and the worst case configuration results are reported in this section.

Test Procedure Used

ANSI C63.26-2015 – Section 5.4.4

Test Settings

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW ≥ 3 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

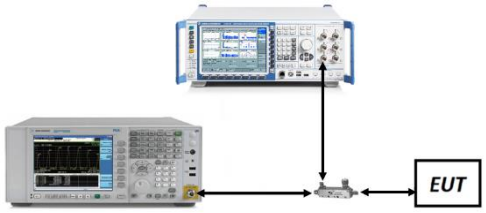


Figure 7-2. Test Instrument & Measurement Setup

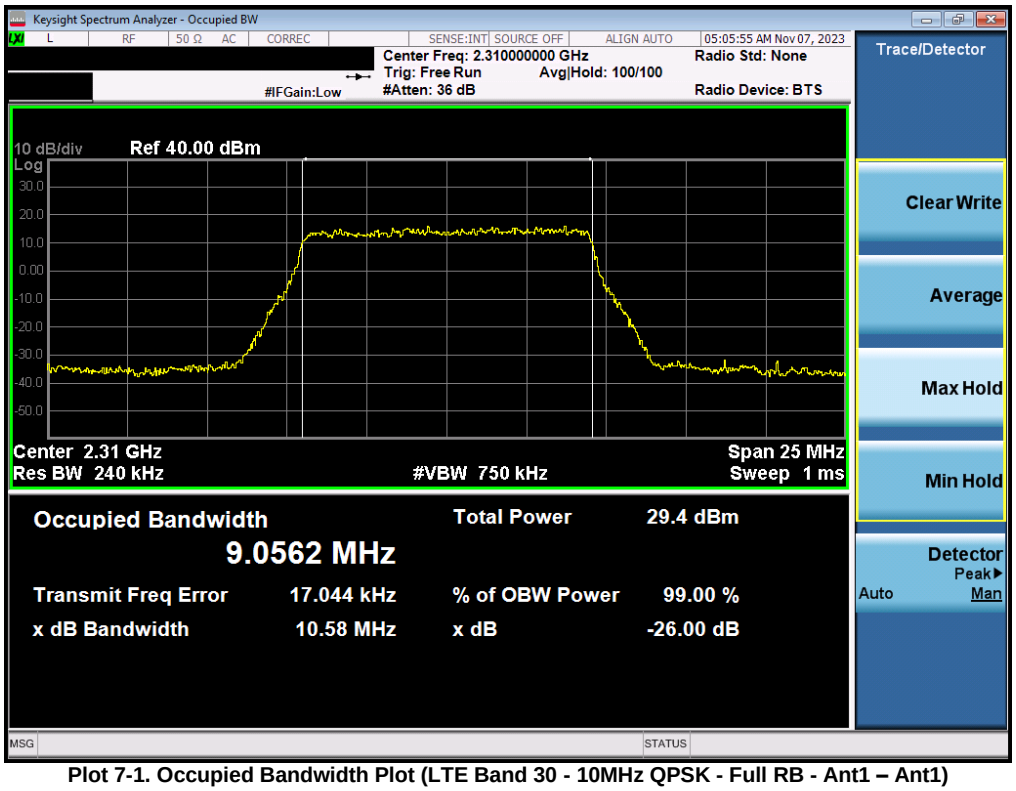
Test Notes

None.

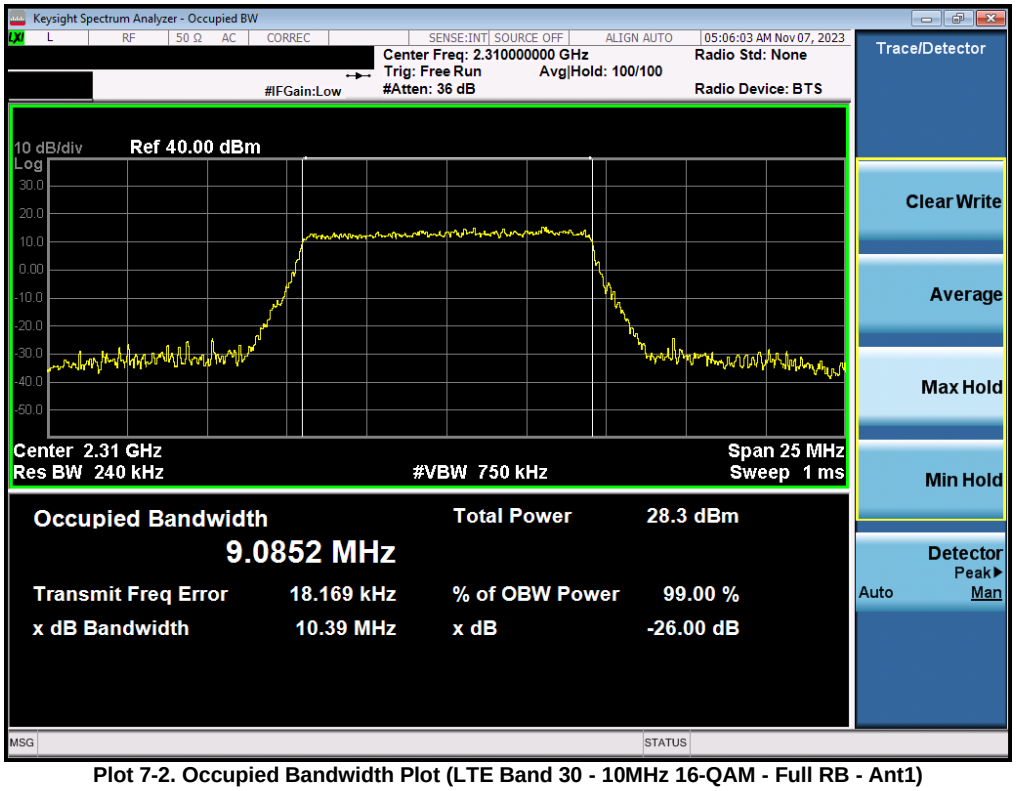
Mode	Bandwidth	Modulation	OBW [MHz]
LTE Band 30	10MHz	QPSK	9.06
		16QAM	9.09
	5 MHz	QPSK	4.56
		16QAM	4.56
LTE Band 7	20 MHz	QPSK	17.97
		16QAM	18.02
	15 MHz	QPSK	13.46
		16QAM	13.48
	10 MHz	QPSK	9.03
		16QAM	9.04
	5 MHz	QPSK	4.53
		16QAM	4.52
LTE Band 41(PC2)	20 MHz	QPSK	17.97
		16QAM	17.87
	15 MHz	QPSK	13.49
		16QAM	13.50
	10 MHz	QPSK	9.06
		16QAM	9.00
	5 MHz	QPSK	4.54
		16QAM	4.51
LTE Band 38	20 MHz	QPSK	17.97
		16QAM	17.99
	15 MHz	QPSK	13.47
		16QAM	13.48
	10 MHz	QPSK	9.04
		16QAM	9.02
	5 MHz	QPSK	4.52
		16QAM	4.50

Table 7-9. Occupied Bandwidth Result – LTE – Ant1

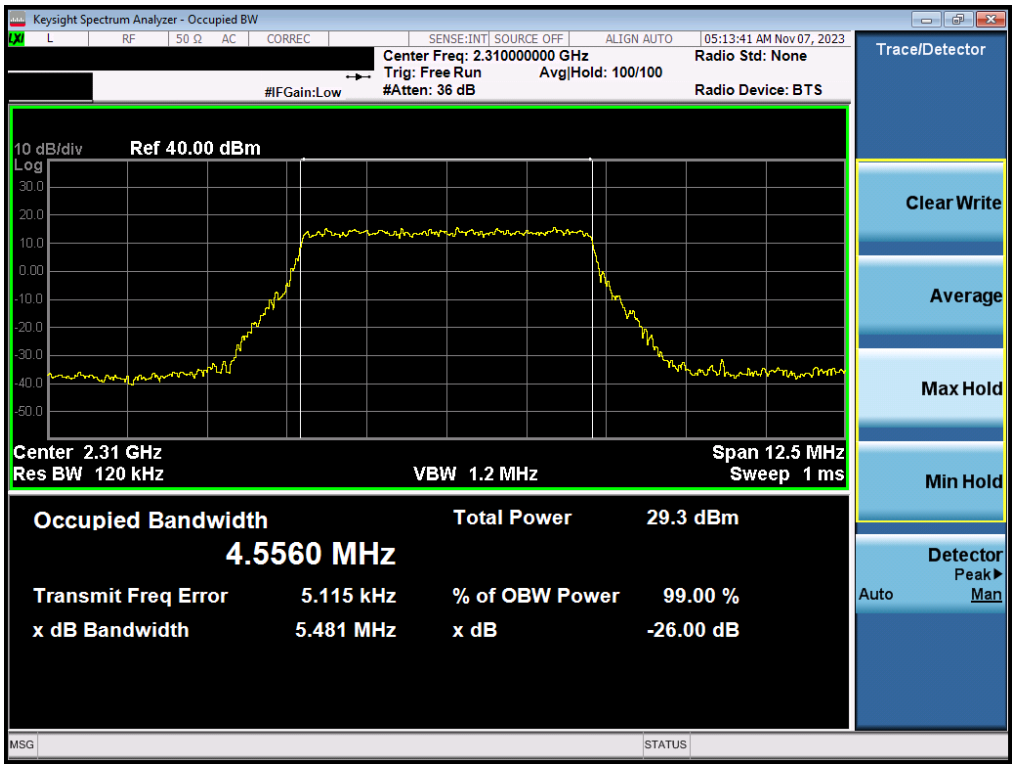
LTE Band 30 – Ant1



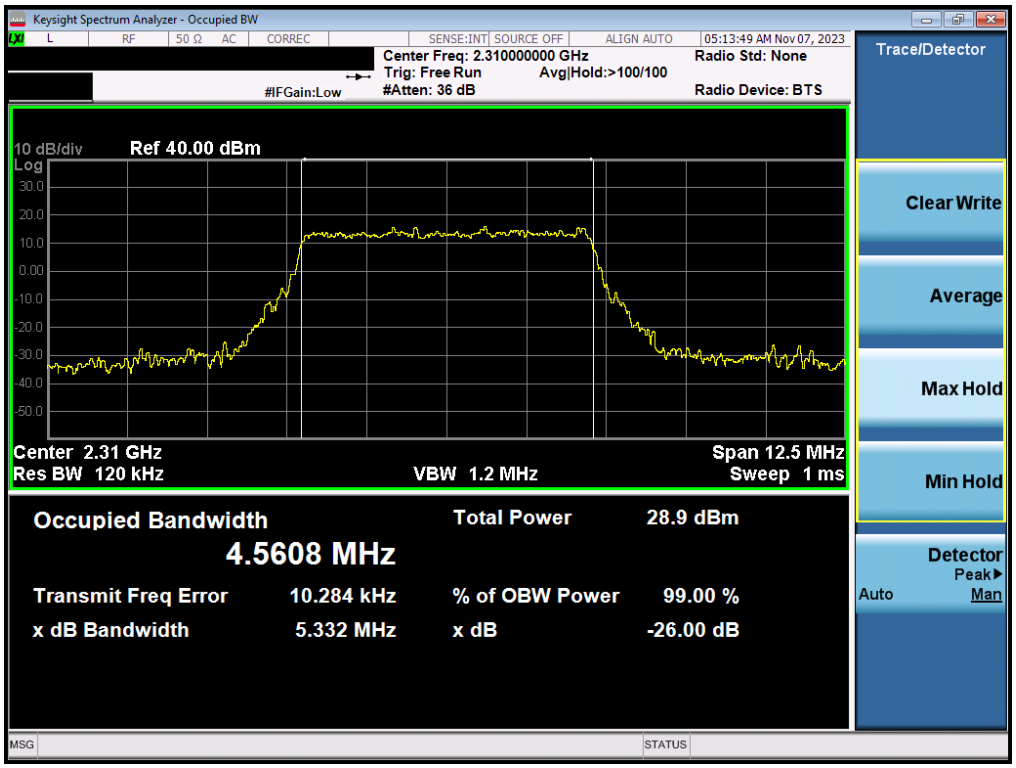
Plot 7-1. Occupied Bandwidth Plot (LTE Band 30 - 10MHz QPSK - Full RB - Ant1 – Ant1)



Plot 7-2. Occupied Bandwidth Plot (LTE Band 30 - 10MHz 16-QAM - Full RB - Ant1)

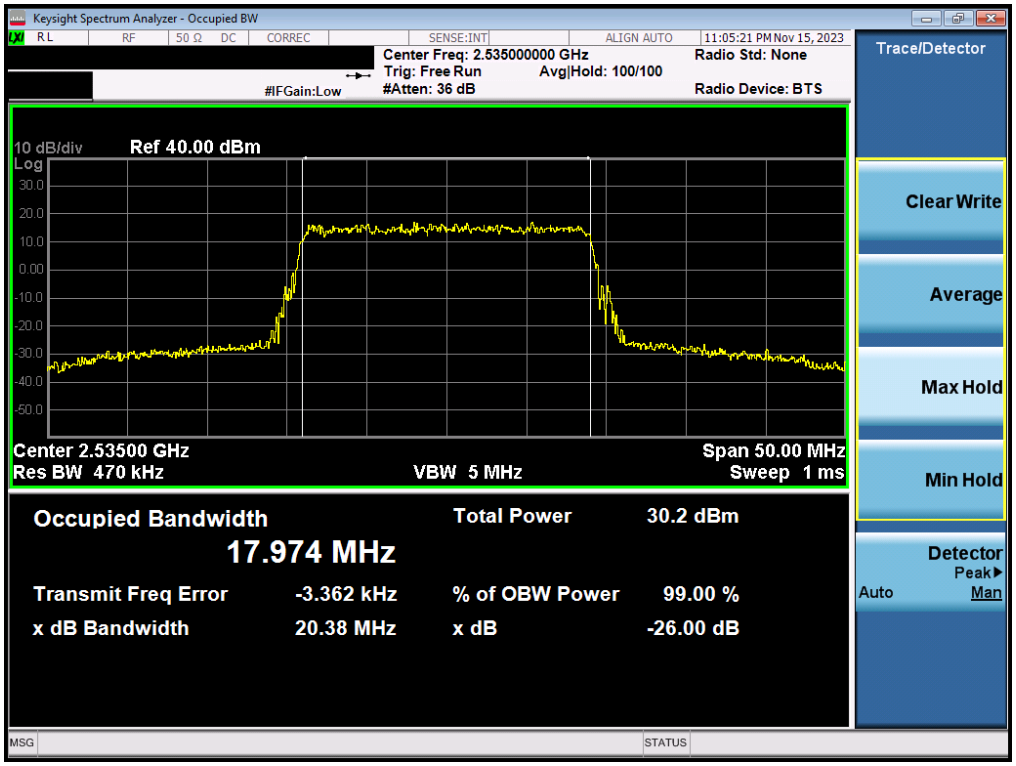


Plot 7-3. Occupied Bandwidth Plot (LTE Band 30 - 5MHz QPSK - Full RB - Ant1)

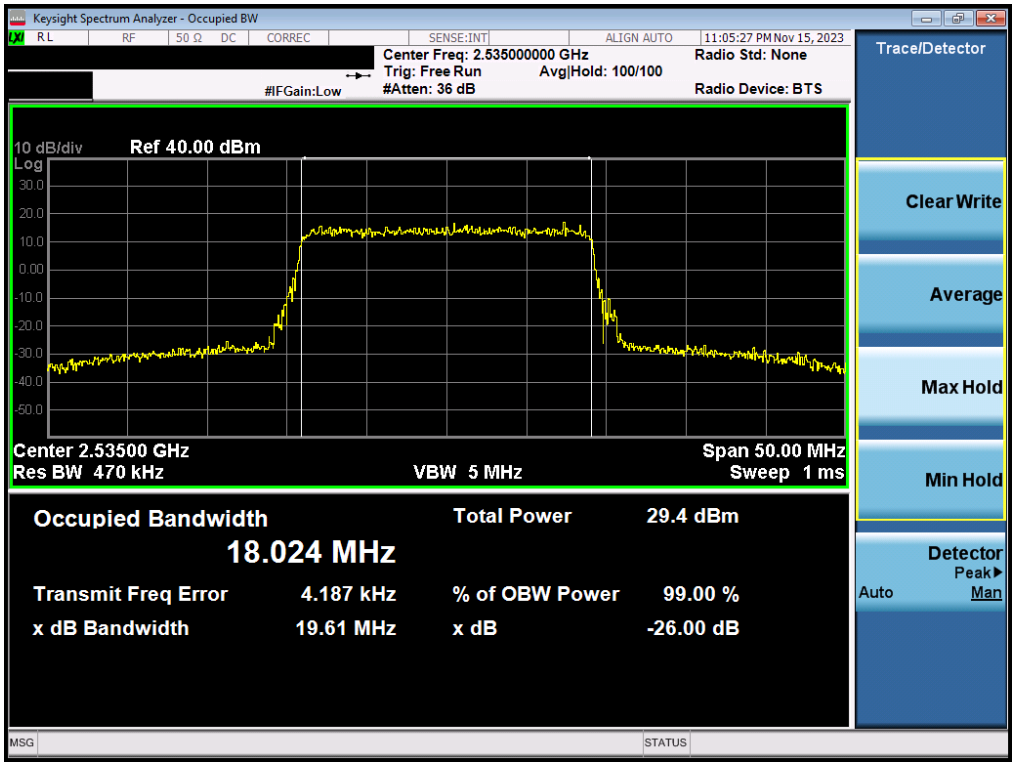


Plot 7-4. Occupied Bandwidth Plot (LTE Band 30 - 5MHz 16-QAM - Full RB - Ant1)

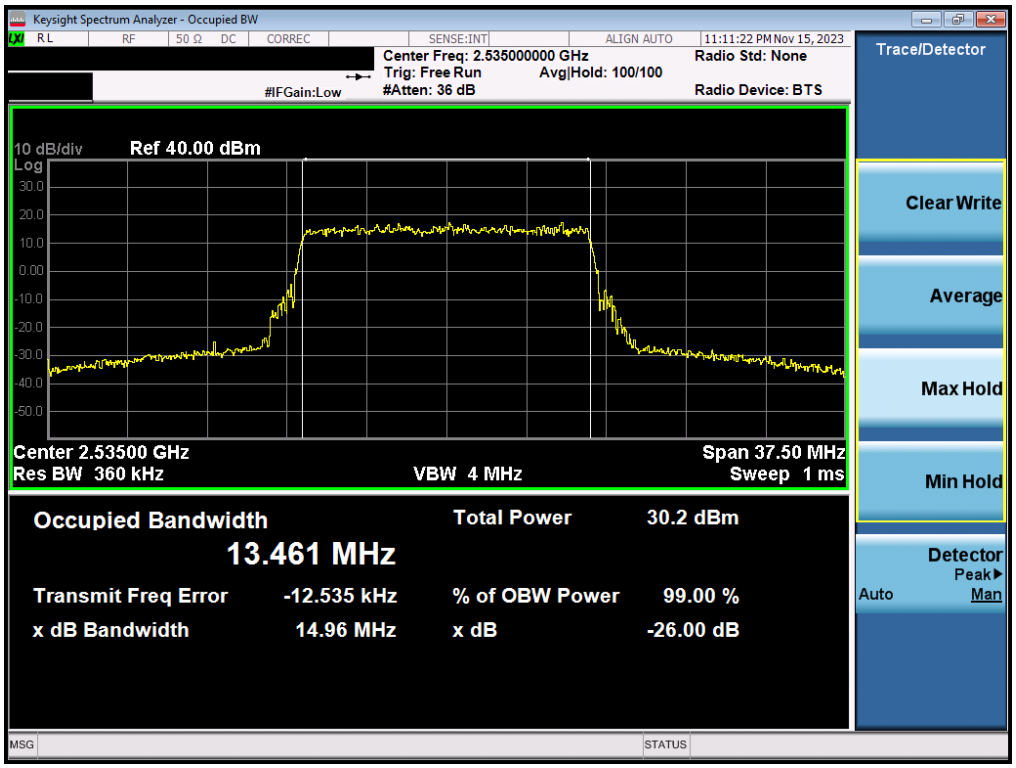
LTE Band 7 – Ant1



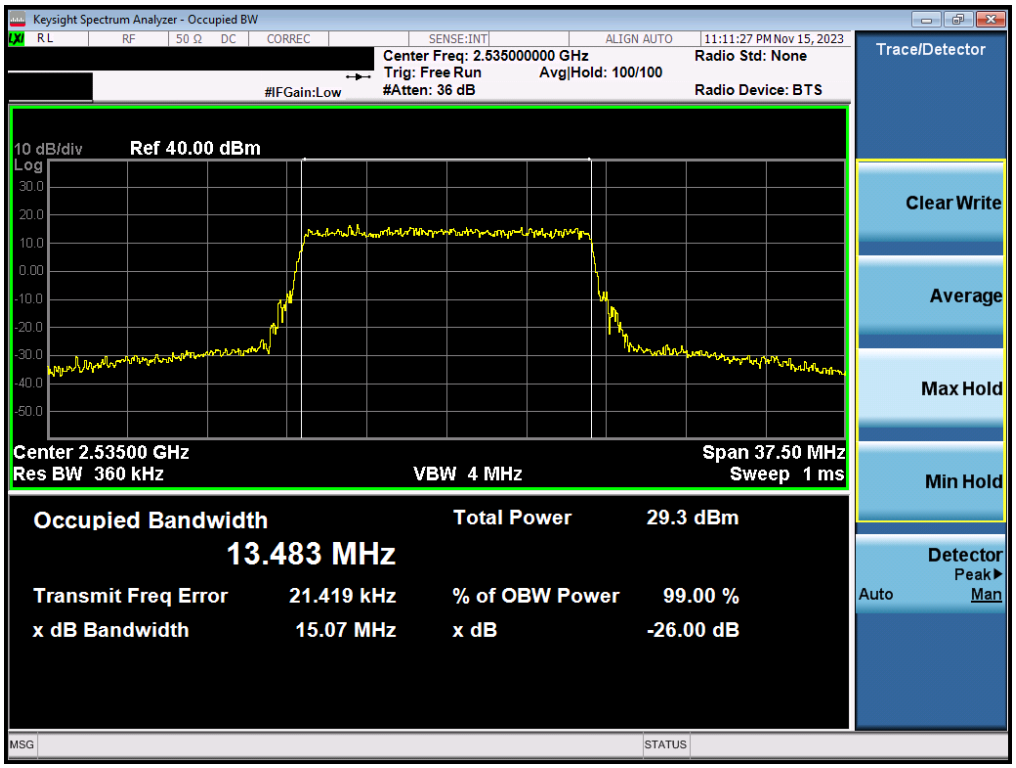
Plot 7-5. Occupied Bandwidth Plot (LTE Band 7 - 20MHz QPSK - Full RB - Ant1)



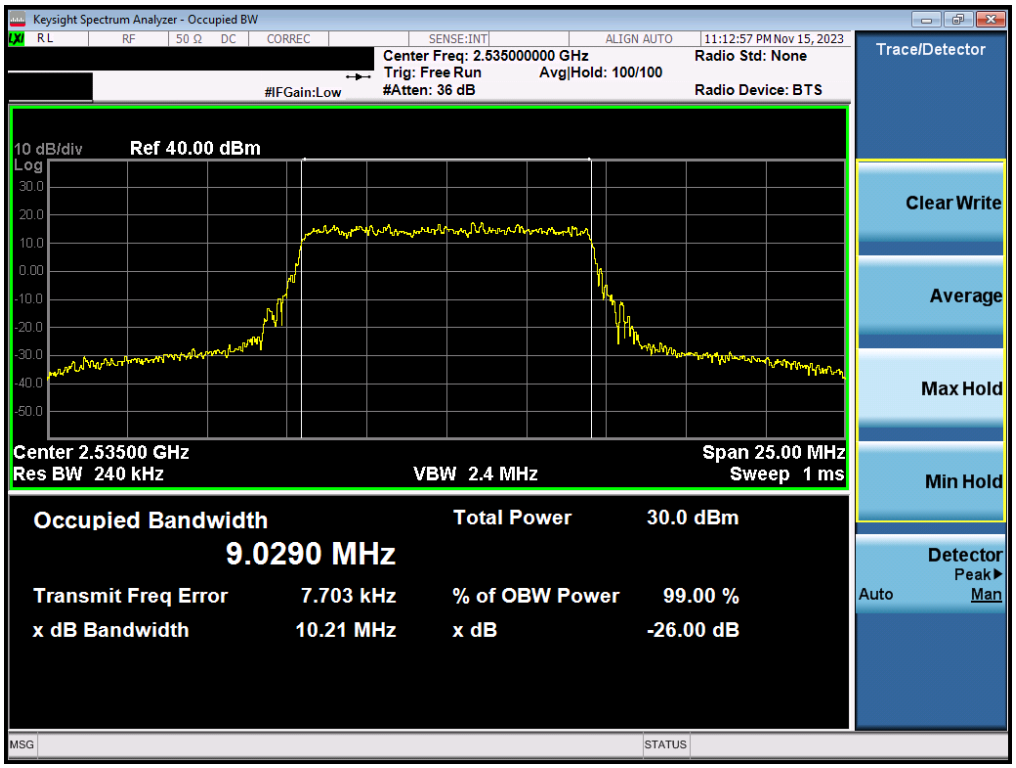
Plot 7-6. Occupied Bandwidth Plot (LTE Band 7 - 20MHz 16-QAM - Full RB - Ant1)



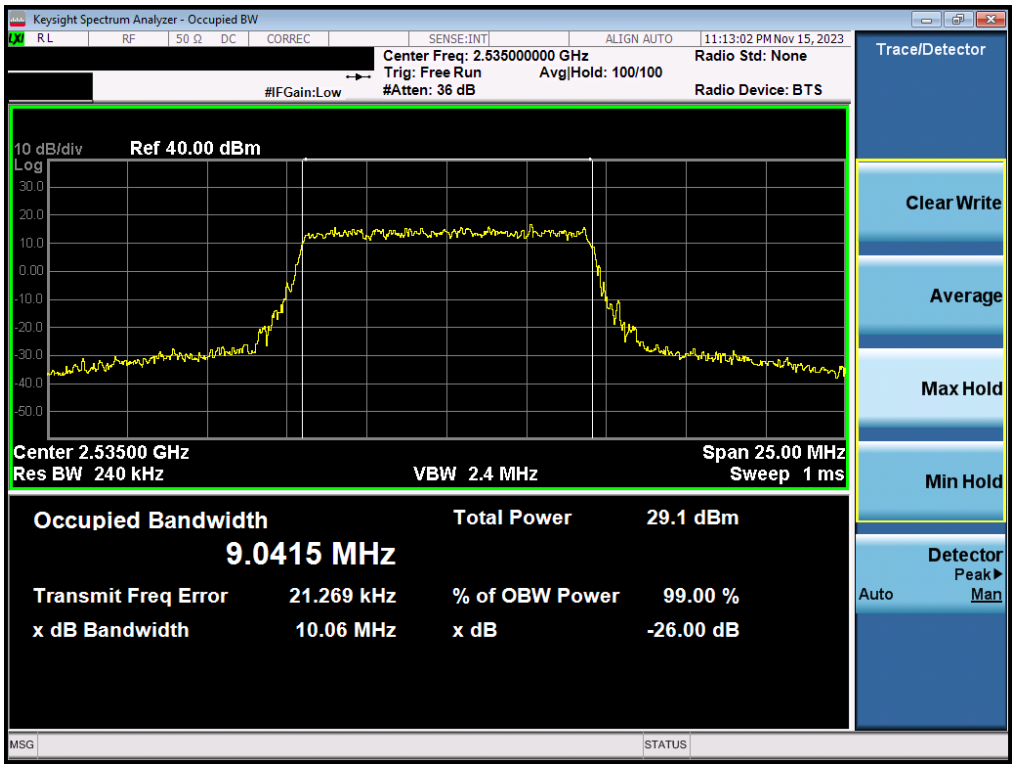
Plot 7-7. Occupied Bandwidth Plot (LTE Band 7 - 15MHz QPSK - Full RB - Ant1)



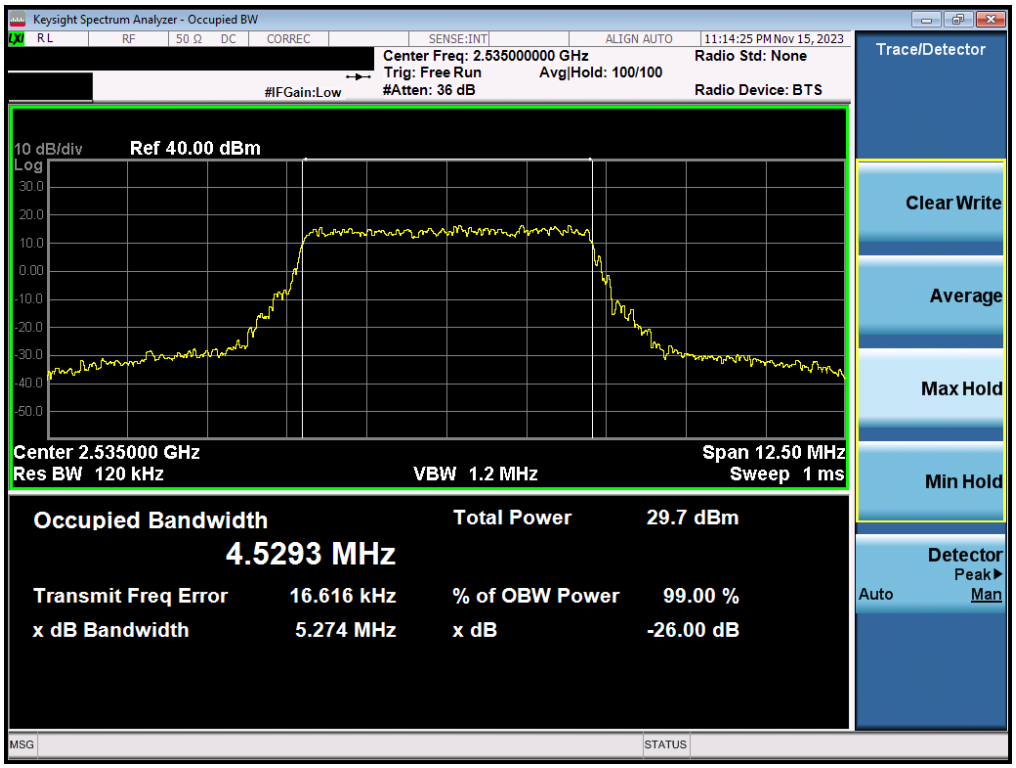
Plot 7-8. Occupied Bandwidth Plot (LTE Band 7 - 15MHz 16-QAM - Full RB - Ant1)



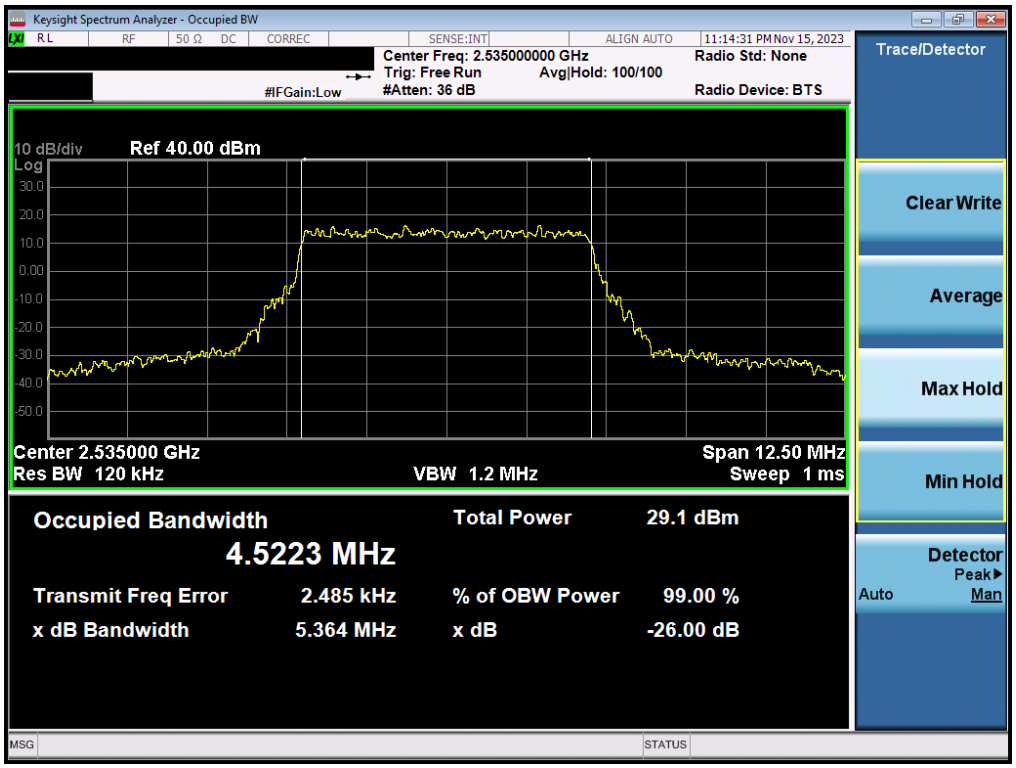
Plot 7-9. Occupied Bandwidth Plot (LTE Band 7 - 10MHz QPSK - Full RB - Ant1)



Plot 7-10. Occupied Bandwidth Plot (LTE Band 7 - 10MHz 16-QAM - Full RB - Ant1)

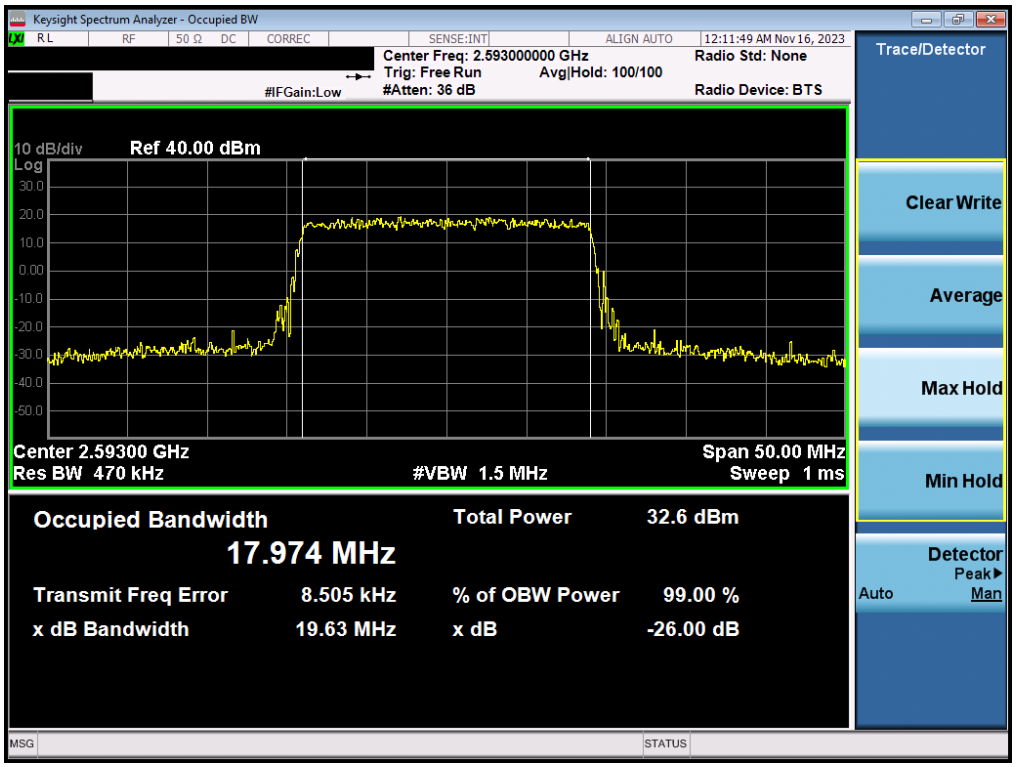


Plot 7-11. Occupied Bandwidth Plot (LTE Band 7 - 5MHz QPSK - Full RB - Ant1)

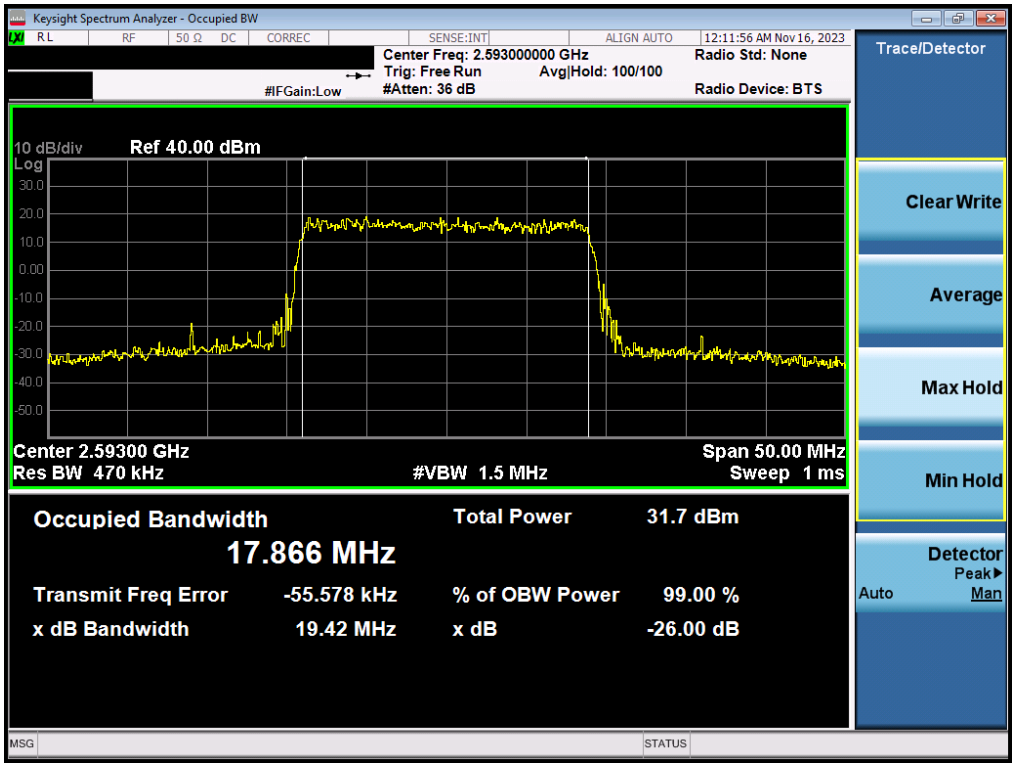


Plot 7-12. Occupied Bandwidth Plot (LTE Band 7 - 5MHz 16-QAM - Full RB - Ant1)

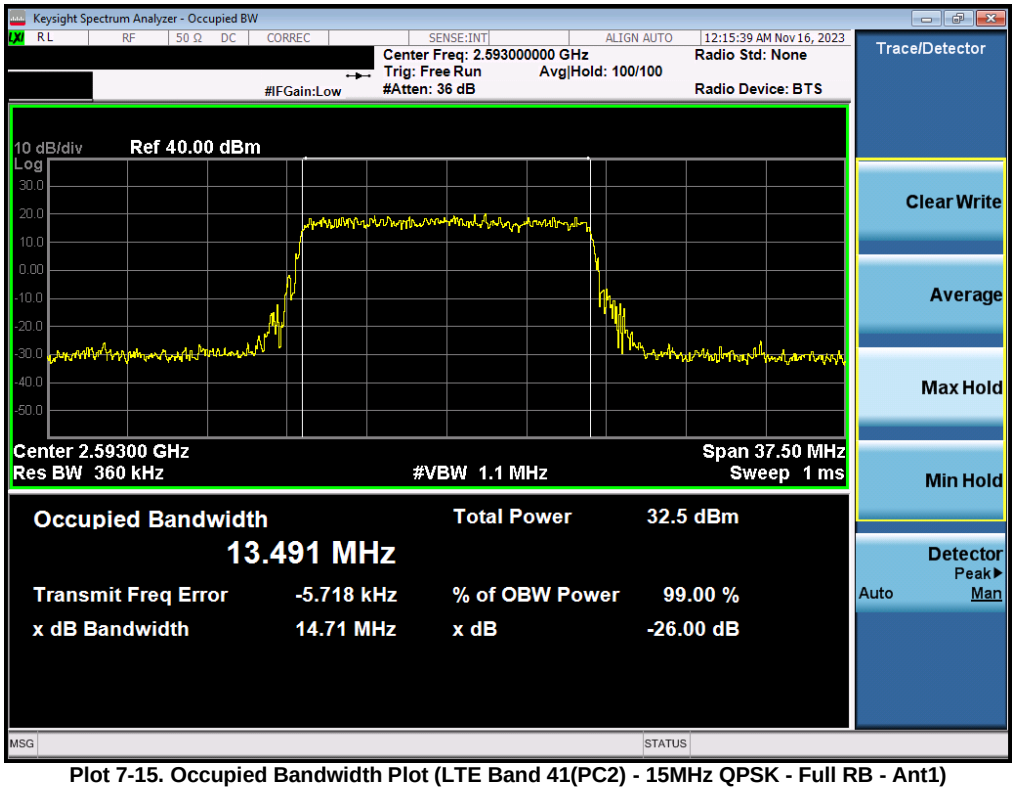
LTE Band 41(PC2) – Ant1



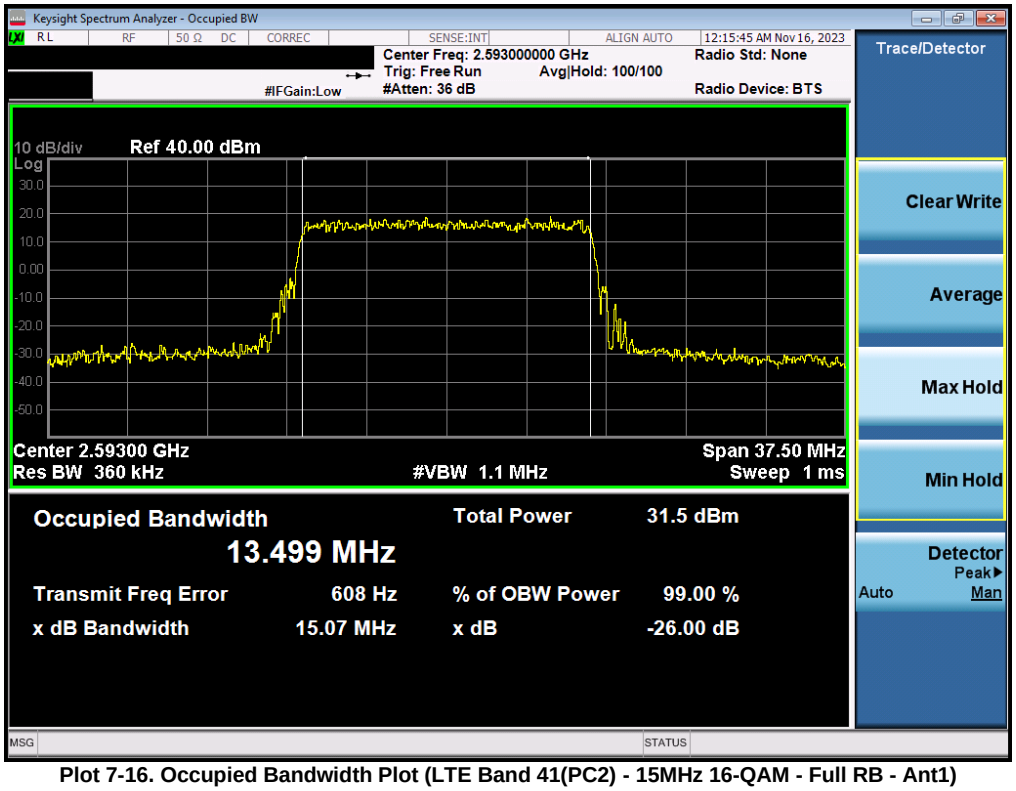
Plot 7-13. Occupied Bandwidth Plot (LTE Band 41(PC2) - 20MHz QPSK - Full RB - Ant1)



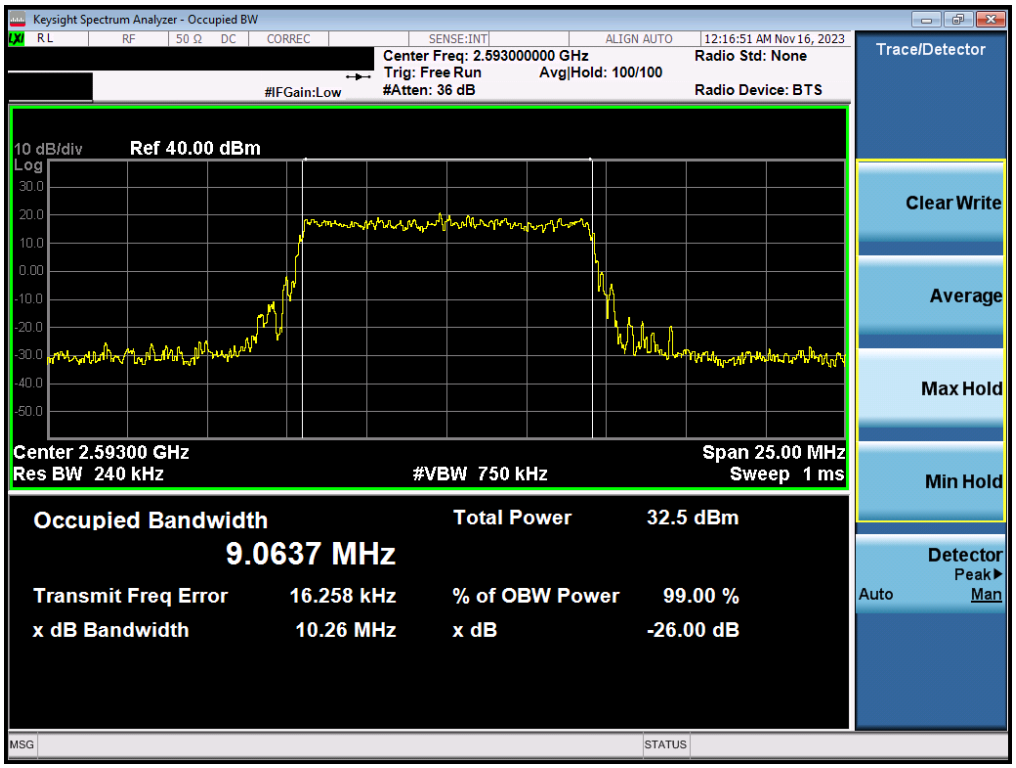
Plot 7-14. Occupied Bandwidth Plot (LTE Band 41(PC2) - 20MHz 16-QAM - Full RB - Ant1)



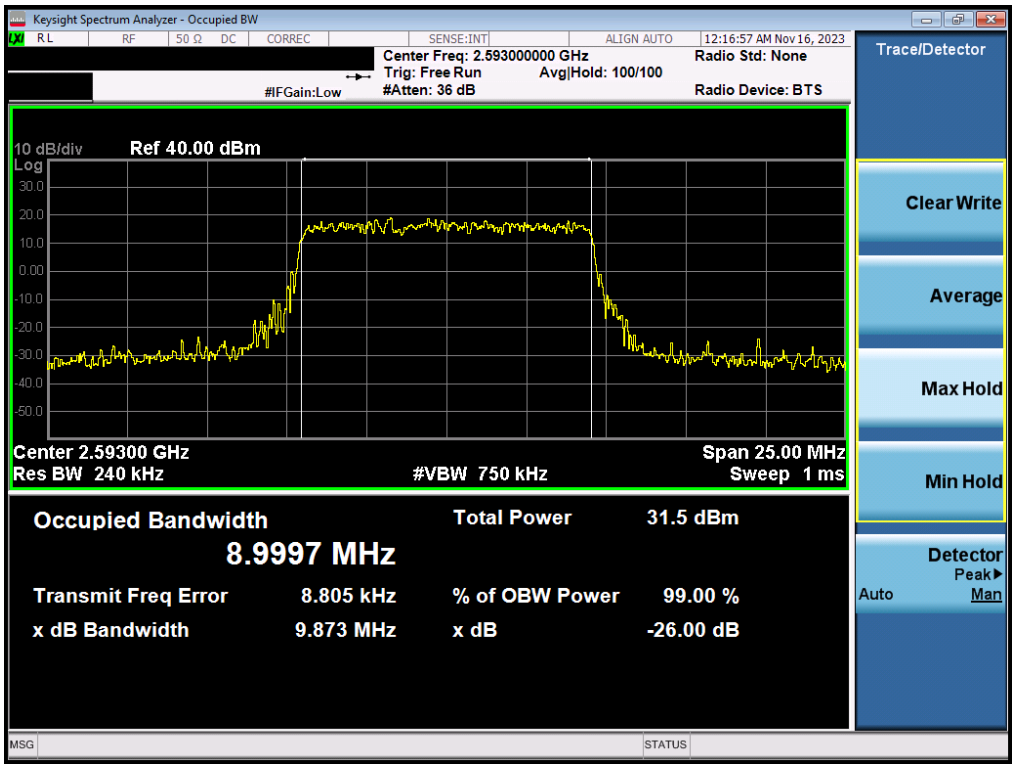
Plot 7-15. Occupied Bandwidth Plot (LTE Band 41(PC2) - 15MHz QPSK - Full RB - Ant1)



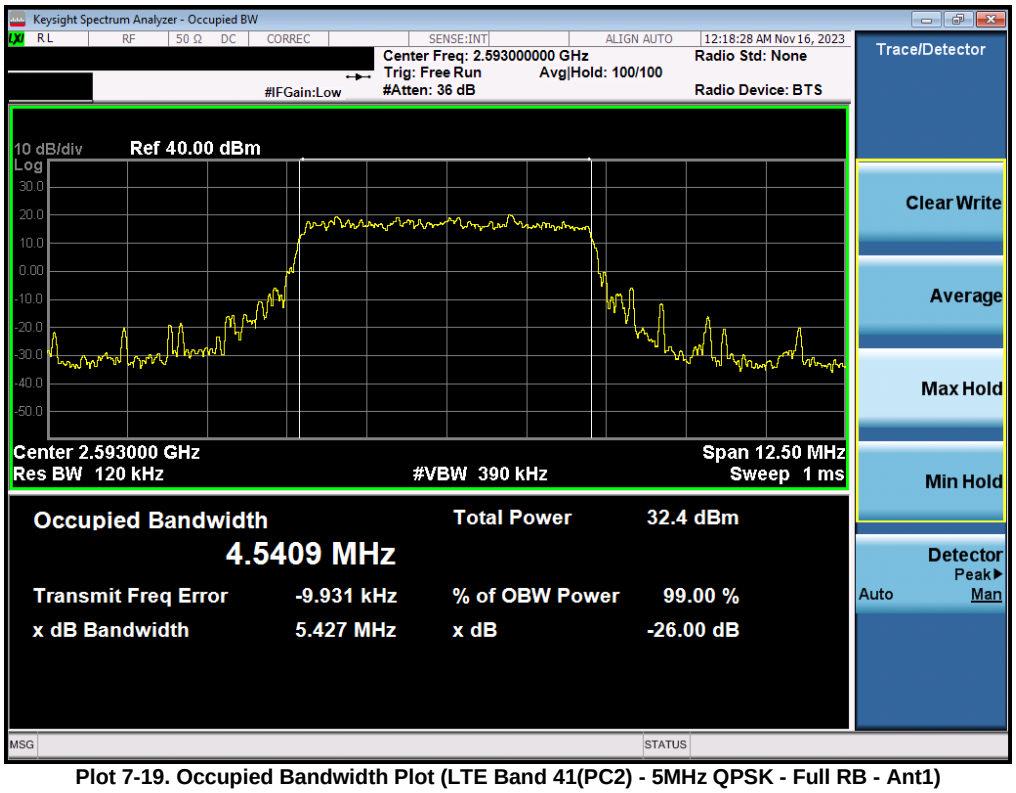
Plot 7-16. Occupied Bandwidth Plot (LTE Band 41(PC2) - 15MHz 16-QAM - Full RB - Ant1)



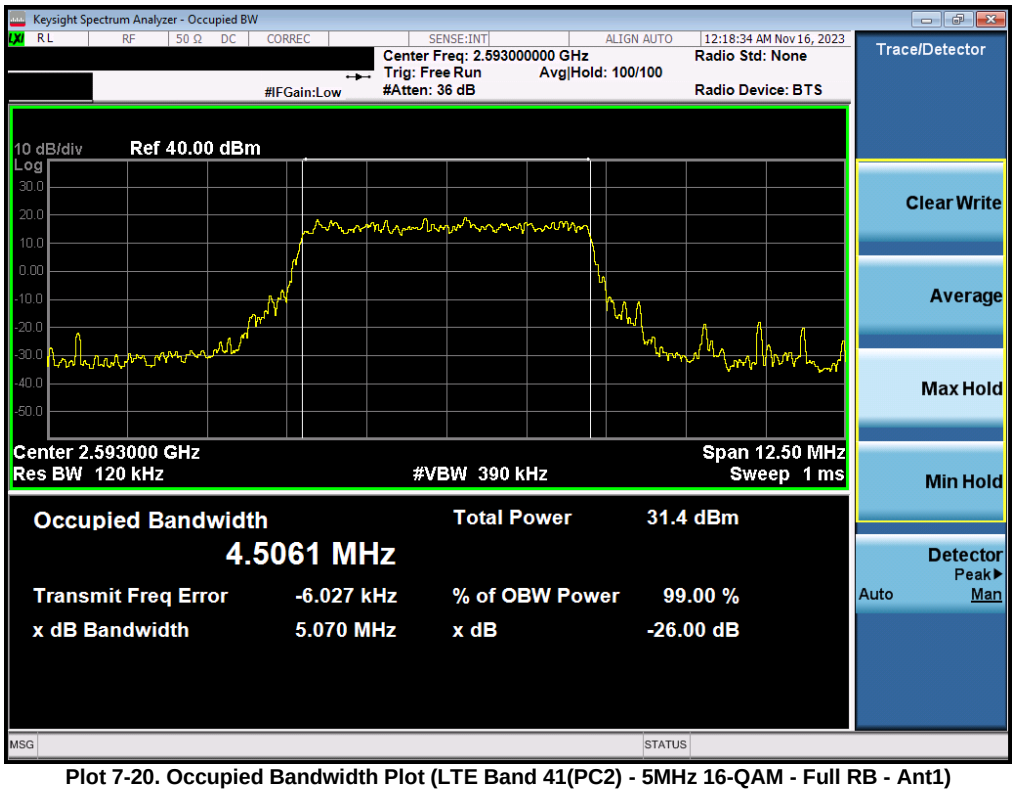
Plot 7-17. Occupied Bandwidth Plot (LTE Band 41(PC2) - 10MHz QPSK - Full RB - Ant1)



Plot 7-18. Occupied Bandwidth Plot (LTE Band 41(PC2) - 10MHz 16-QAM - Full RB - Ant1)

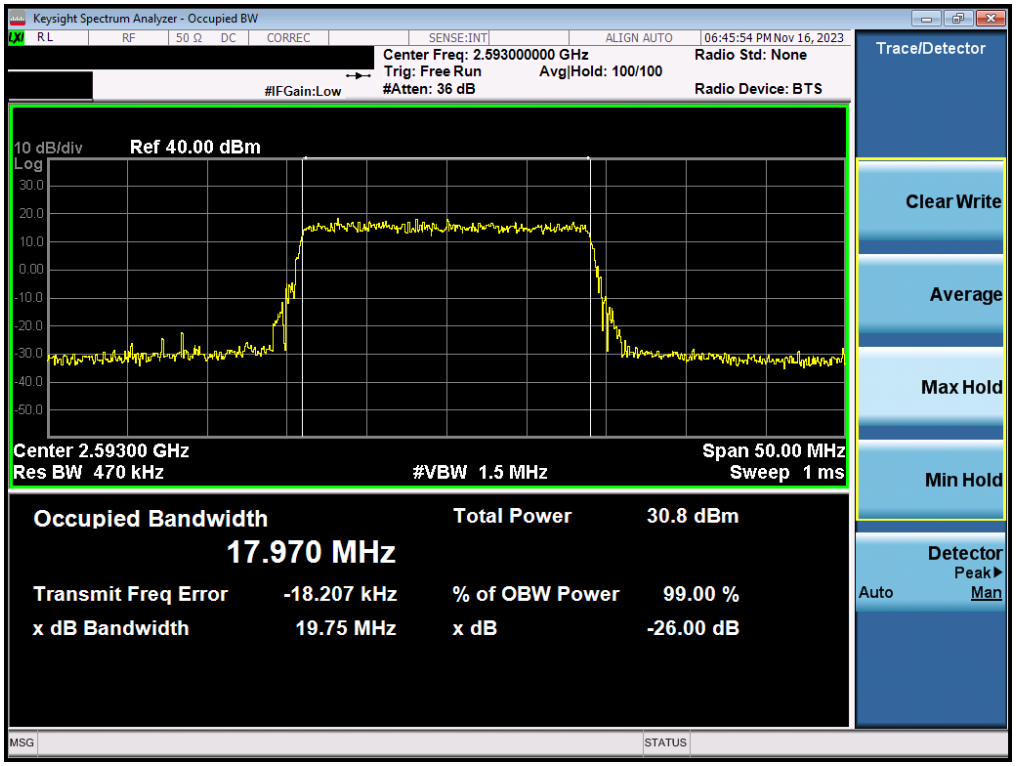


Plot 7-19. Occupied Bandwidth Plot (LTE Band 41(PC2) - 5MHz QPSK - Full RB - Ant1)



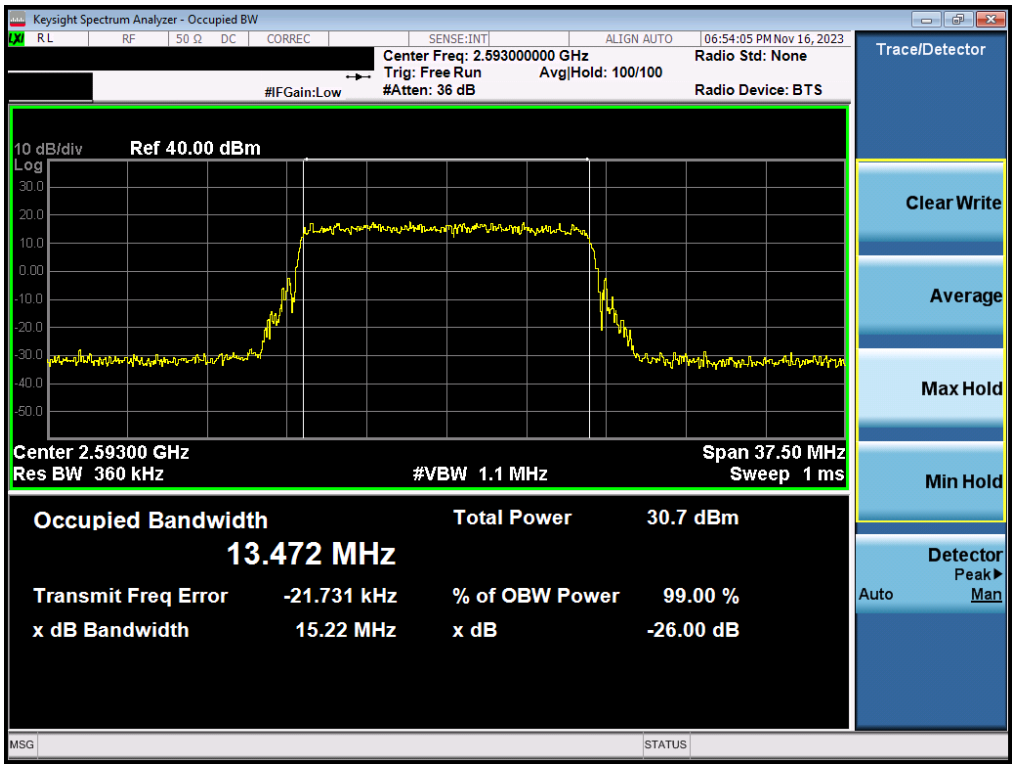
Plot 7-20. Occupied Bandwidth Plot (LTE Band 41(PC2) - 5MHz 16-QAM - Full RB - Ant1)

LTE Band 38 – Ant1

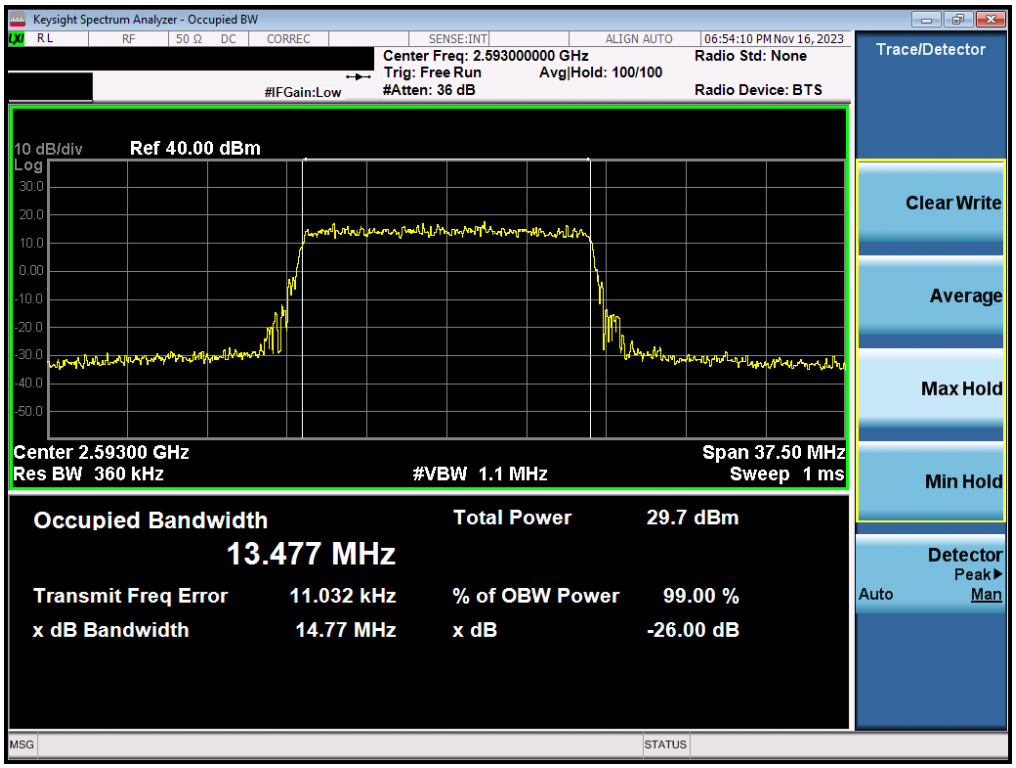


Plot 7-21. Occupied Bandwidth Plot (LTE Band 38 - 20MHz QPSK - Full RB - Ant1)

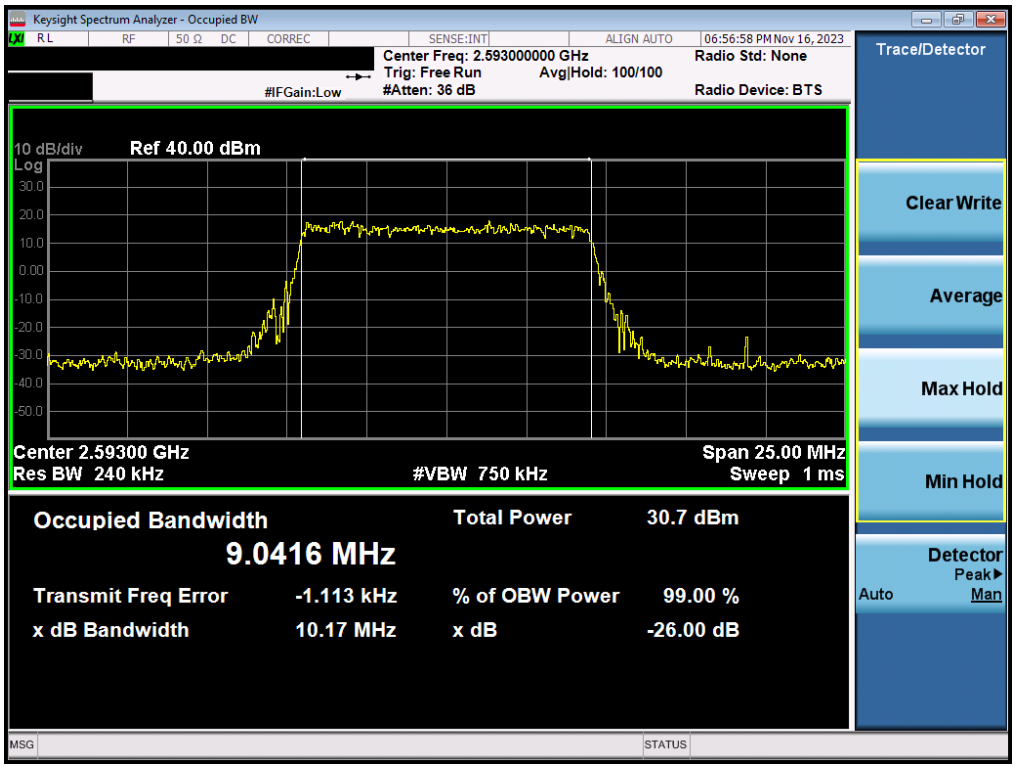
Plot 7-22. Occupied Bandwidth Plot (LTE Band 38 - 20MHz 16-QAM - Full RB - Ant1)



Plot 7-23. Occupied Bandwidth Plot (LTE Band 38 - 15MHz QPSK - Full RB - Ant1)

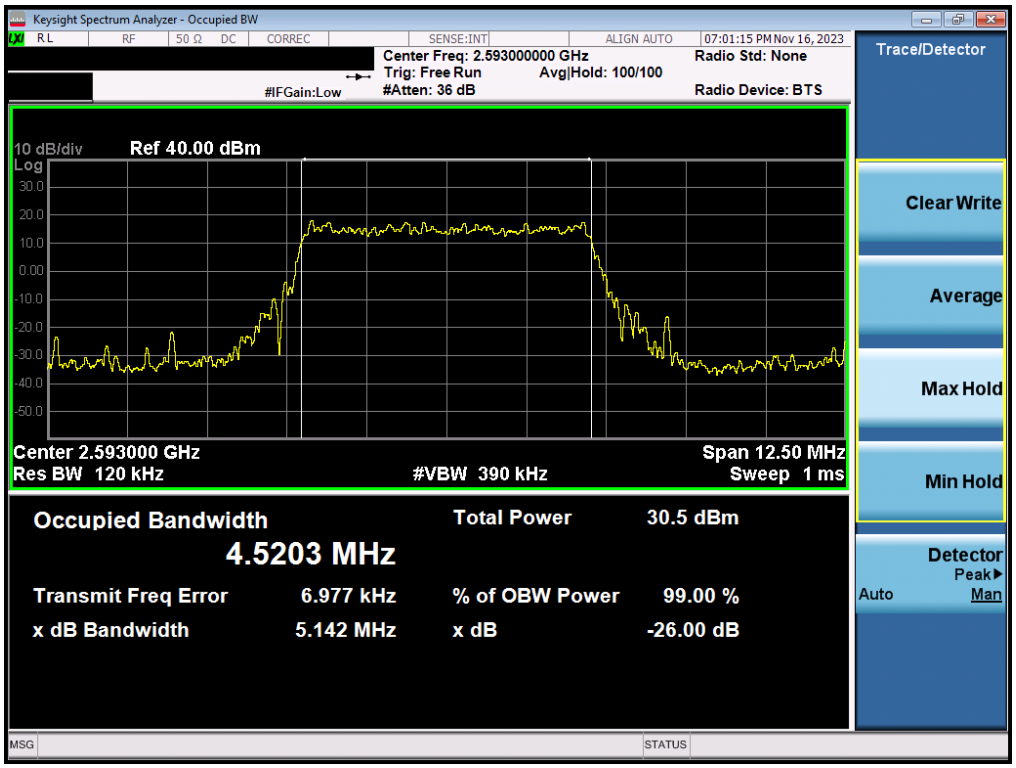


Plot 7-24. Occupied Bandwidth Plot (LTE Band 38 - 15MHz 16-QAM - Full RB - Ant1)

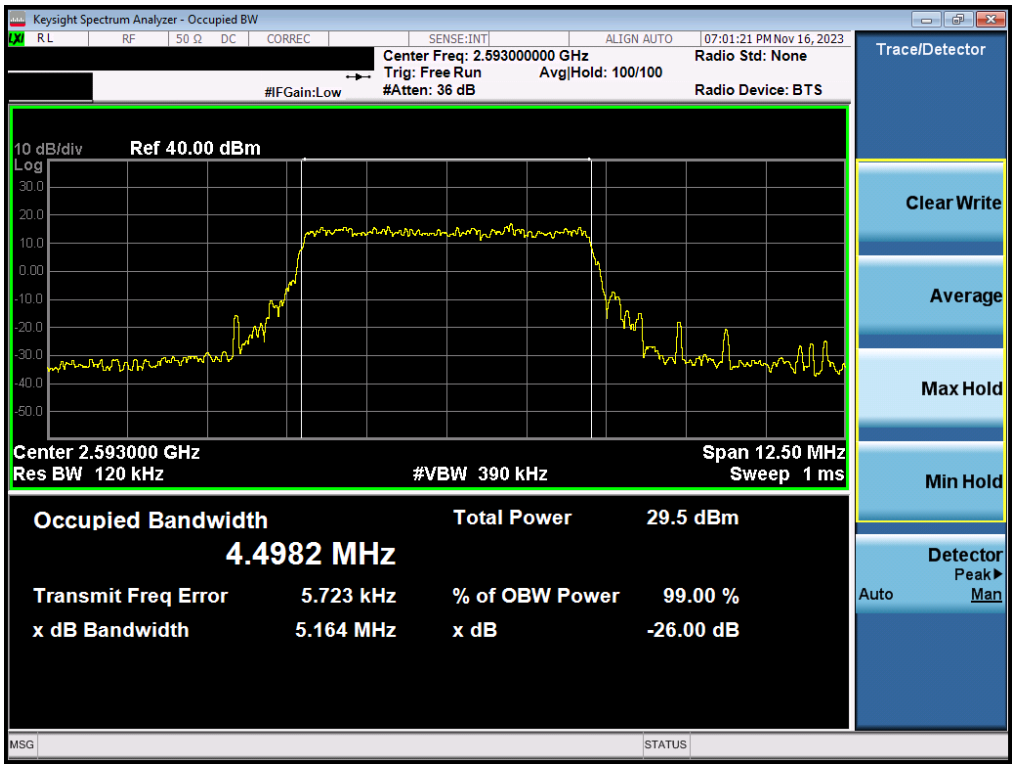


Plot 7-25. Occupied Bandwidth Plot (LTE Band 38 - 10MHz QPSK - Full RB - Ant1)

Plot 7-26. Occupied Bandwidth Plot (LTE Band 38 - 10MHz 16-QAM - Full RB - Ant1)



Plot 7-27. Occupied Bandwidth Plot (LTE Band 38 - 5MHz QPSK - Full RB - Ant1)

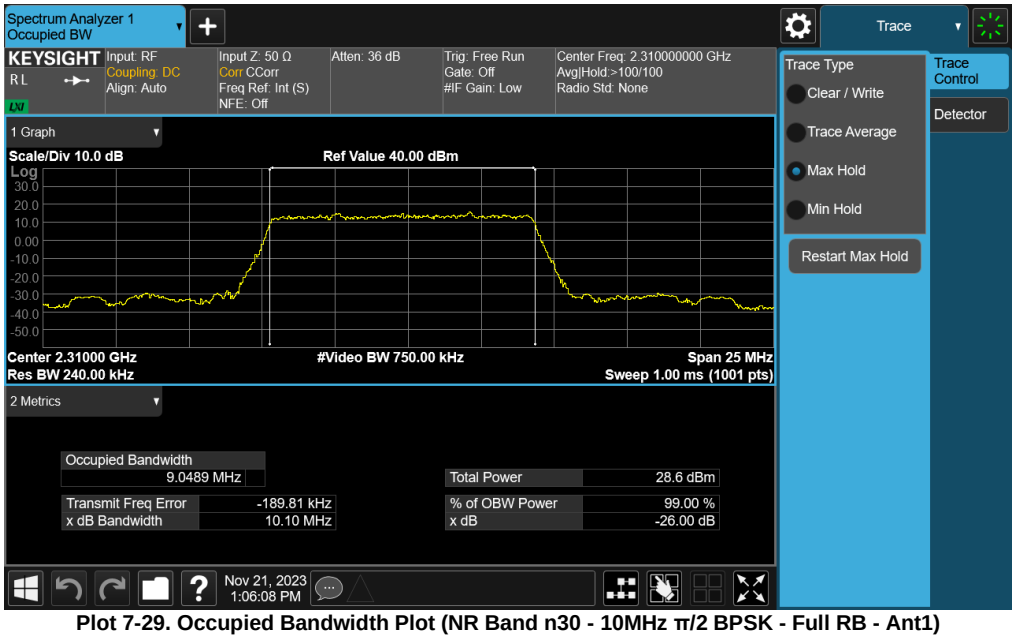


Plot 7-28. Occupied Bandwidth Plot (LTE Band 38 - 5MHz 16-QAM - Full RB - Ant1)

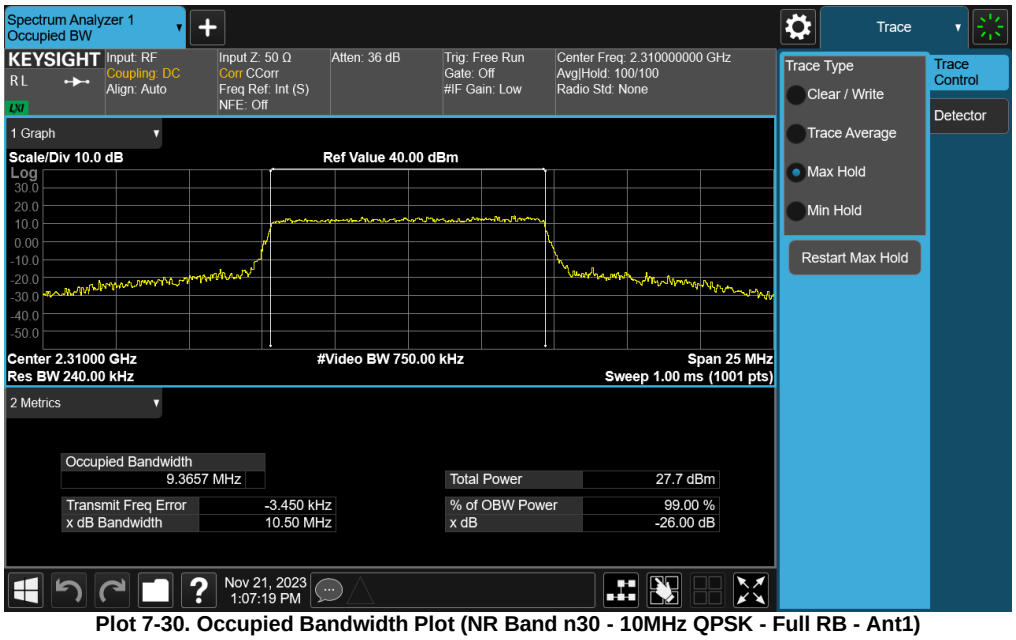
Mode	Bandwidth	Modulation	OBW [MHz]
NR-n30	10MHz	BPSK	9.05
		QPSK	9.37
		16QAM	9.35
	5MHz	BPSK	4.56
		QPSK	4.54
		16QAM	4.53
NR-n41PC2	100MHz	BPSK	96.97
		QPSK	97.82
		16QAM	97.68
	90MHz	BPSK	87.24
		QPSK	87.68
		16QAM	87.96
	80MHz	BPSK	77.47
		QPSK	77.84
		16QAM	77.86
	70MHz	BPSK	64.63
		QPSK	67.80
		16QAM	67.71
	60MHz	BPSK	58.35
		QPSK	58.26
		16QAM	58.23
	50MHz	BPSK	46.09
		QPSK	47.85
		16QAM	47.67
	40MHz	BPSK	36.00
		QPSK	38.12
		16QAM	38.09
	30MHz	BPSK	26.99
		QPSK	28.01
		16QAM	28.03
	20MHz	BPSK	18.00
		QPSK	18.33
		16QAM	18.37
	15MHz	BPSK	13.02
		QPSK	13.67
		16QAM	13.73
	10MHz	BPSK	8.69
		QPSK	8.74
		16QAM	8.66

Table 7-10. Occupied Bandwidth Results – NR – Ant1

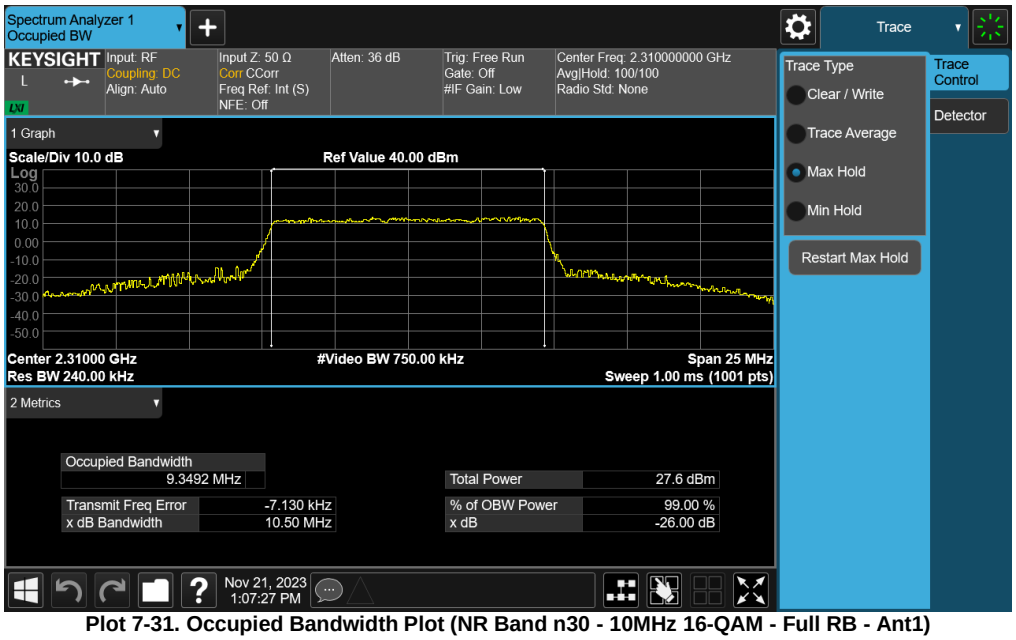
NR Band n30 – Ant1



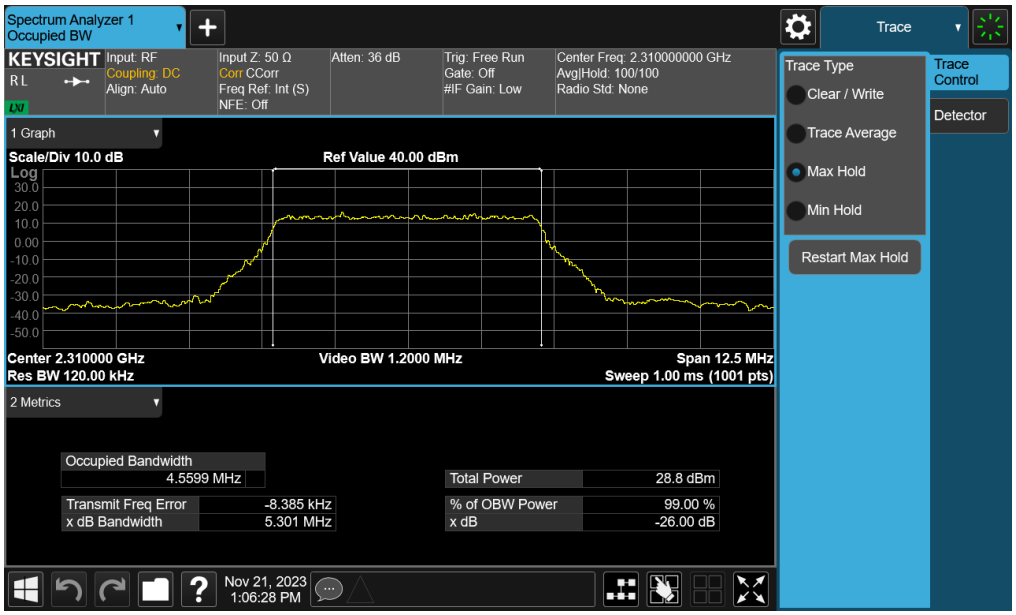
Plot 7-29. Occupied Bandwidth Plot (NR Band n30 - 10MHz π/2 BPSK - Full RB - Ant1)



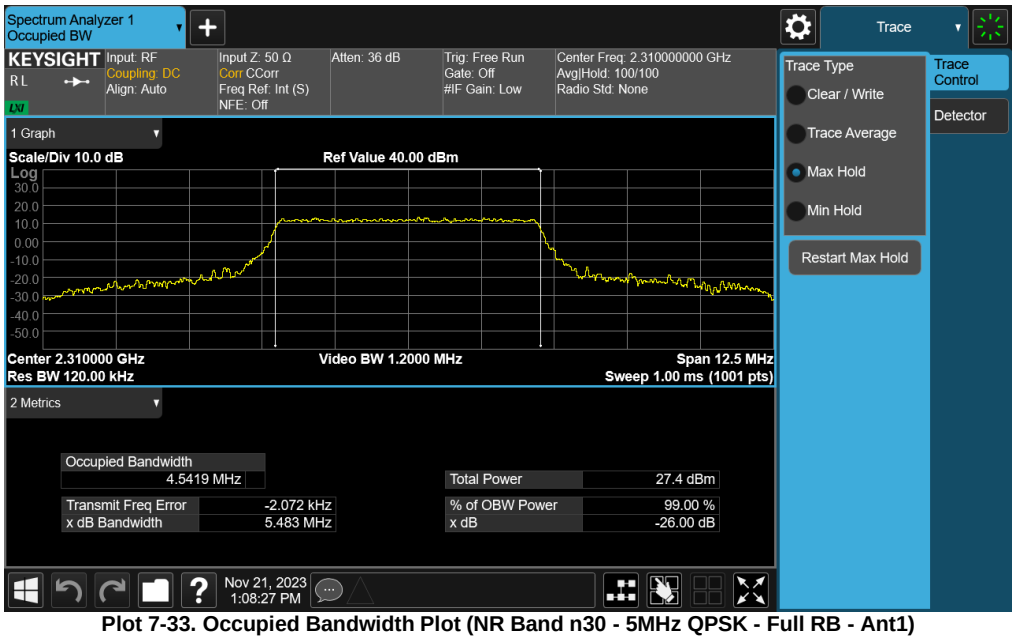
Plot 7-30. Occupied Bandwidth Plot (NR Band n30 - 10MHz QPSK - Full RB - Ant1)



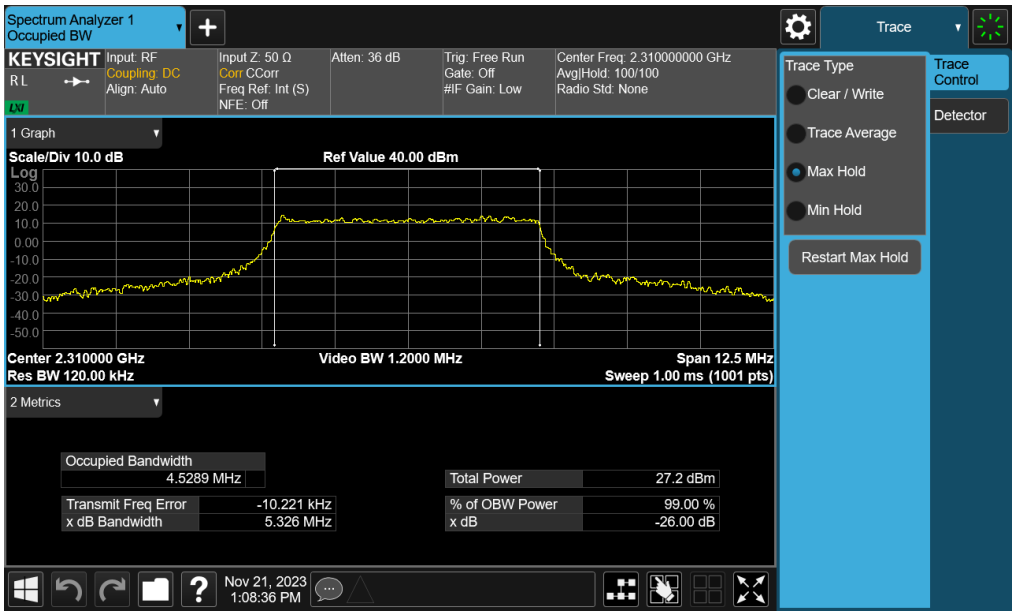
Plot 7-31. Occupied Bandwidth Plot (NR Band n30 - 10MHz 16-QAM - Full RB - Ant1)



Plot 7-32. Occupied Bandwidth Plot (NR Band n30 - 5MHz π/2 BPSK - Full RB - Ant1)



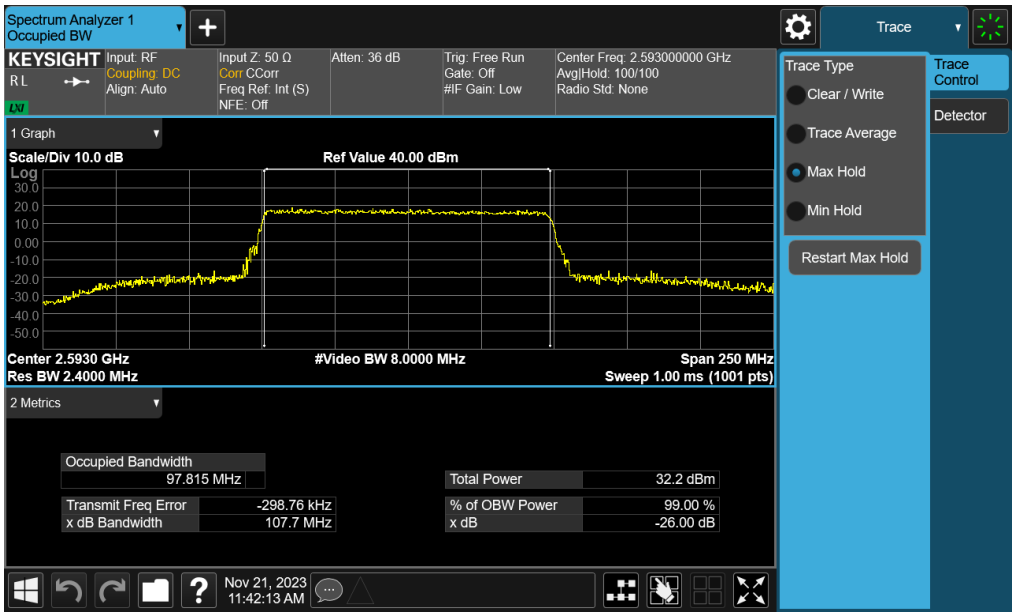
Plot 7-33. Occupied Bandwidth Plot (NR Band n30 - 5MHz QPSK - Full RB - Ant1)



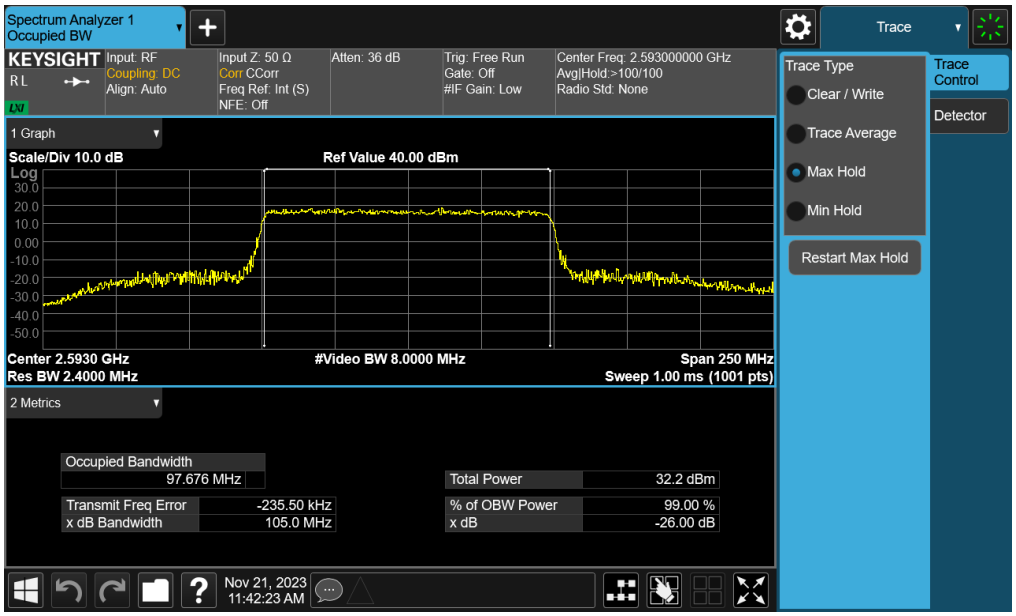
Plot 7-34. Occupied Bandwidth Plot (NR Band n30 - 5MHz 16-QAM - Full RB - Ant1)

NR Band n41 – Ant1

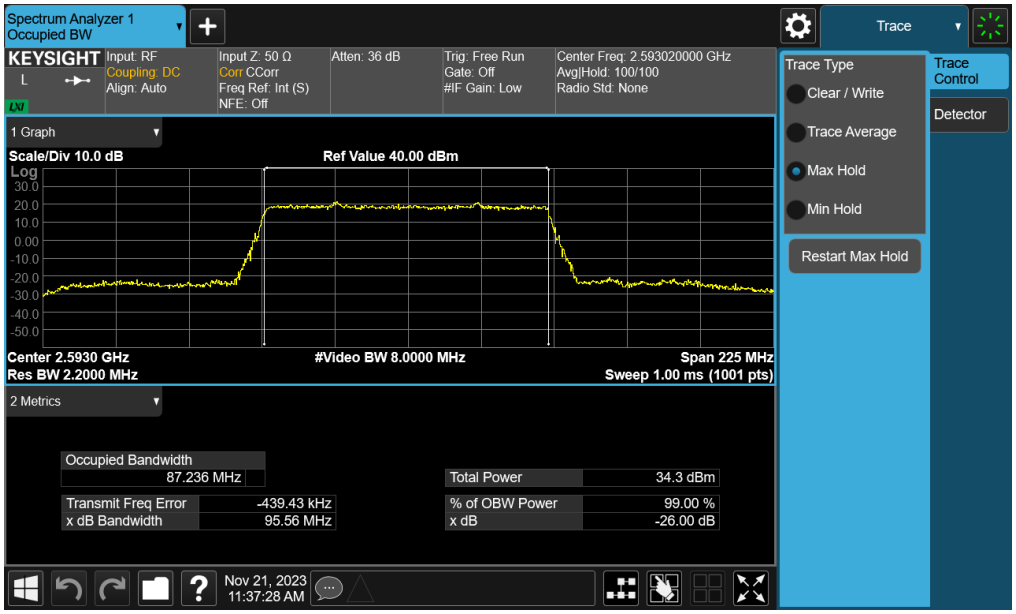
Plot 7-35. Occupied Bandwidth Plot (NR Band n41 - 100MHz π/2 BPSK - Full RB Configuration - Ant1)



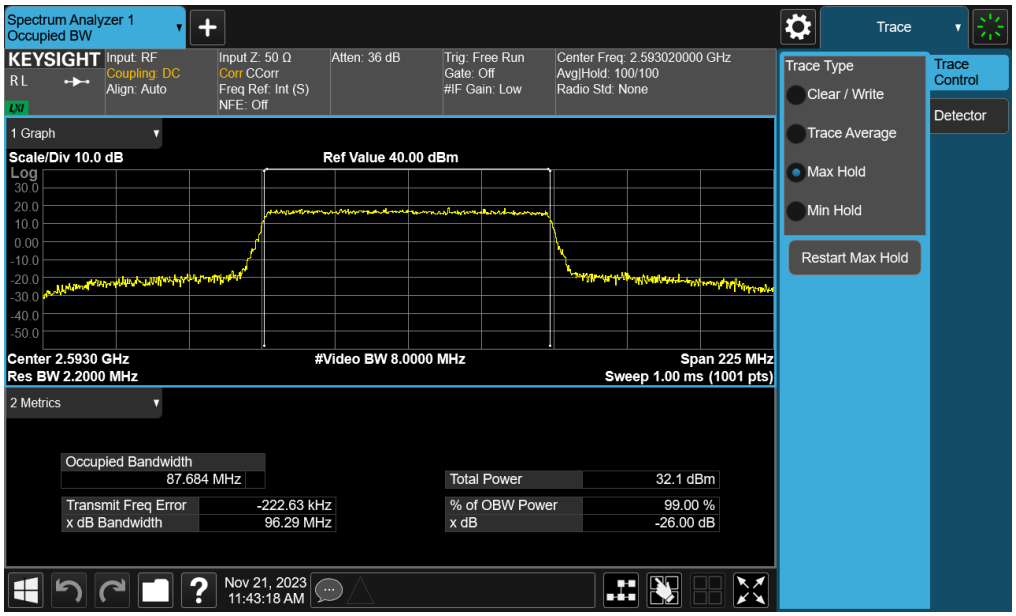
Plot 7-36. Occupied Bandwidth Plot (NR Band n41 - 100MHz QPSK - Full RB Configuration - Ant1)



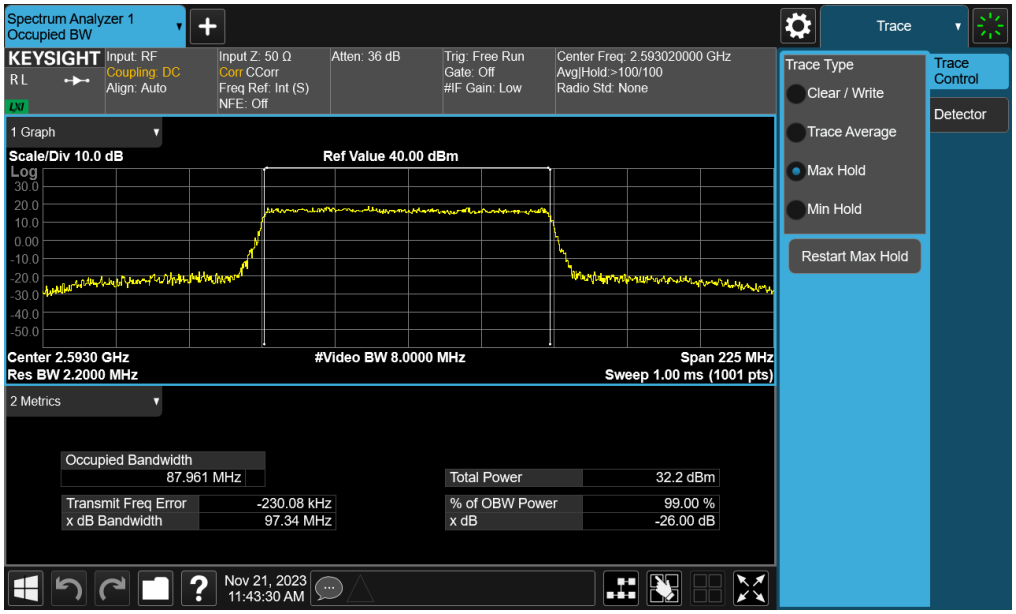
Plot 7-37. Occupied Bandwidth Plot (NR Band n41 - 100MHz 16-QAM - Full RB Configuration - Ant1)



Plot 7-38. Occupied Bandwidth Plot (NR Band n41 - 90MHz π/2 BPSK - Full RB Configuration - Ant1)

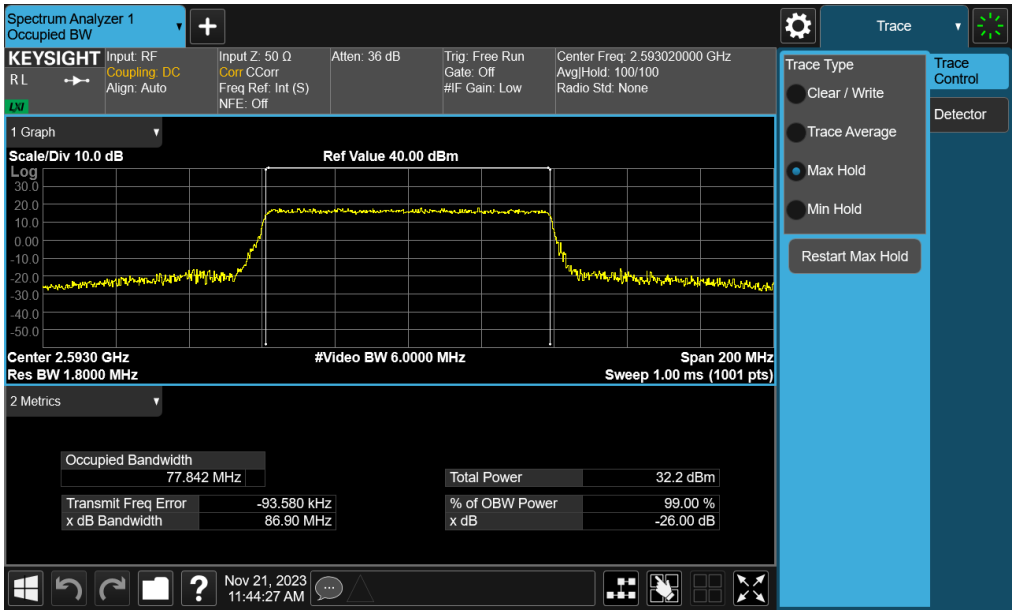


Plot 7-39. Occupied Bandwidth Plot (NR Band n41 - 90MHz QPSK - Full RB Configuration - Ant1)

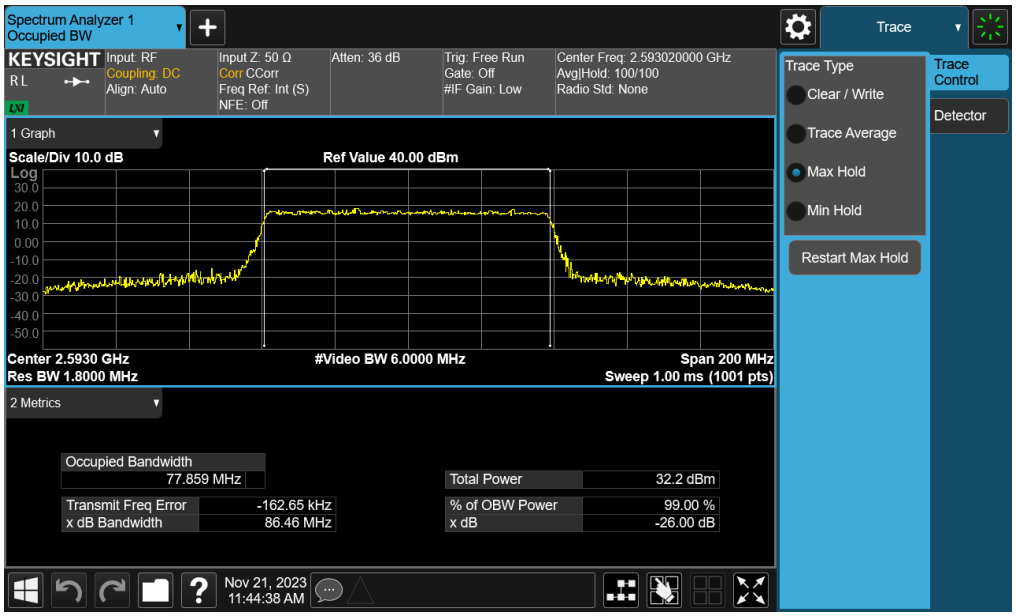


Plot 7-40. Occupied Bandwidth Plot (NR Band n41 - 90MHz 16-QAM - Full RB Configuration - Ant1)

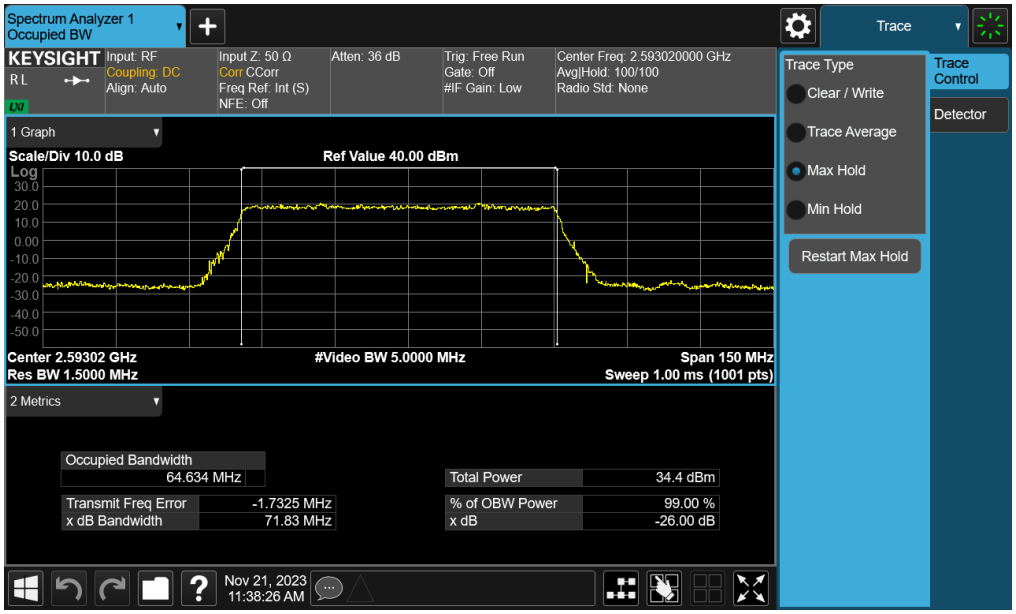
Plot 7-41. Occupied Bandwidth Plot (NR Band n41 - 80MHz π/2 BPSK - Full RB Configuration - Ant1)



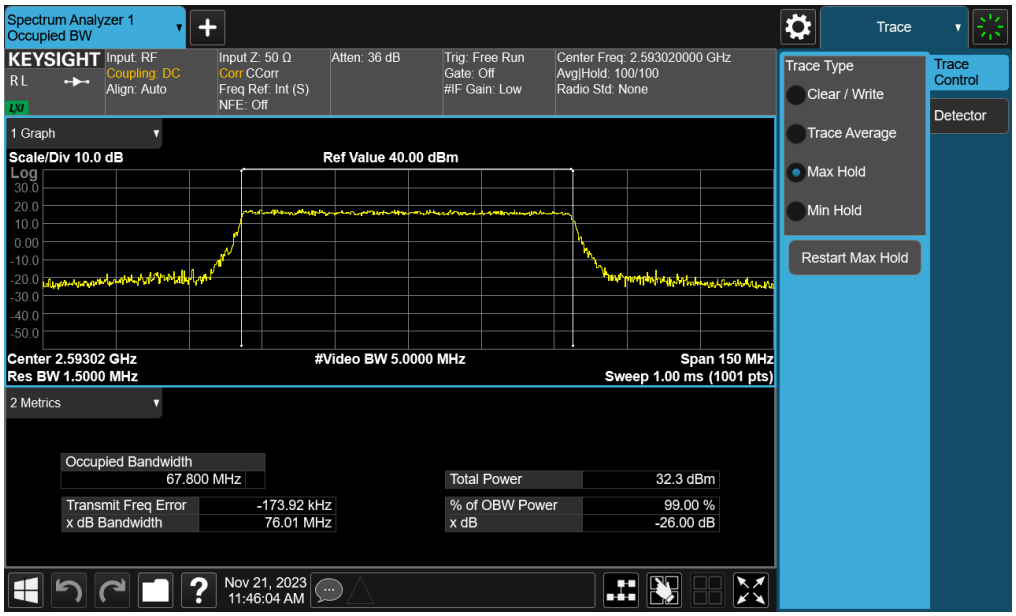
Plot 7-42. Occupied Bandwidth Plot (NR Band n41 - 80MHz QPSK - Full RB Configuration - Ant1)



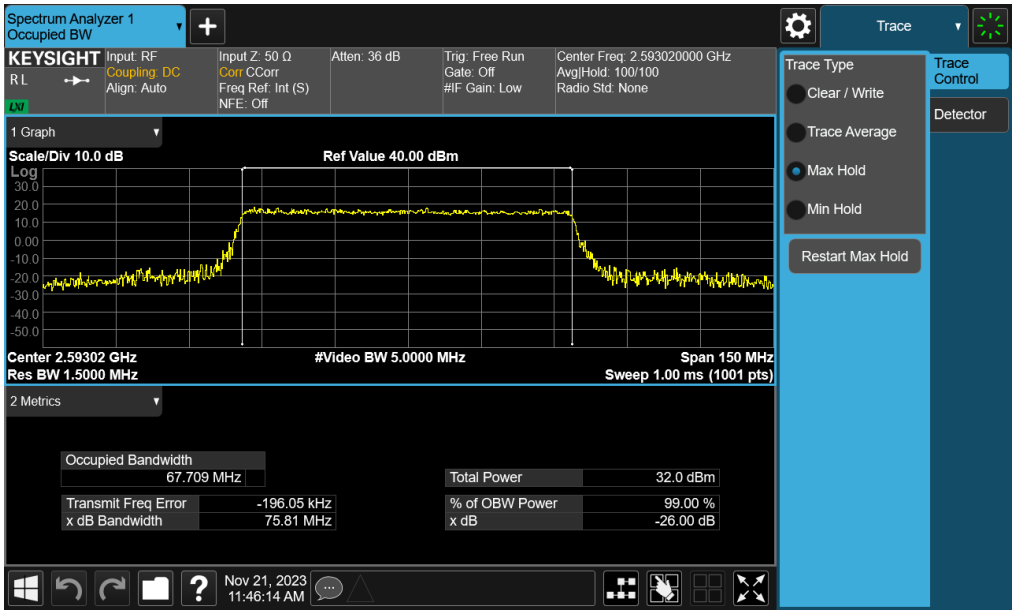
Plot 7-43. Occupied Bandwidth Plot (NR Band n41 - 80MHz 16-QAM - Full RB Configuration - Ant1)



Plot 7-44. Occupied Bandwidth Plot (NR Band n41 - 70MHz π/2 BPSK - Full RB Configuration - Ant1)

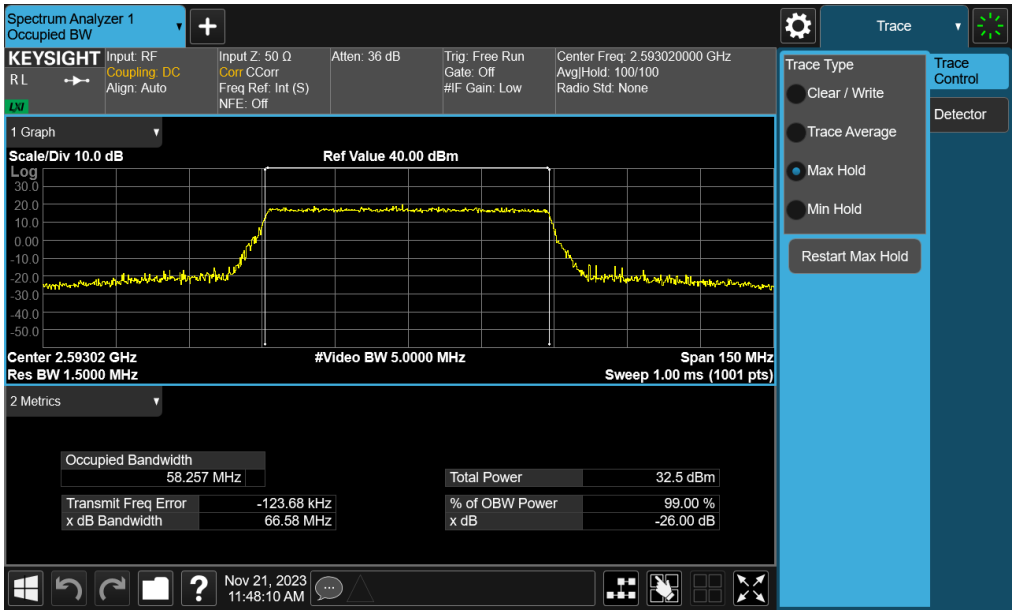


Plot 7-45. Occupied Bandwidth Plot (NR Band n41 - 70MHz QPSK - Full RB Configuration - Ant1)

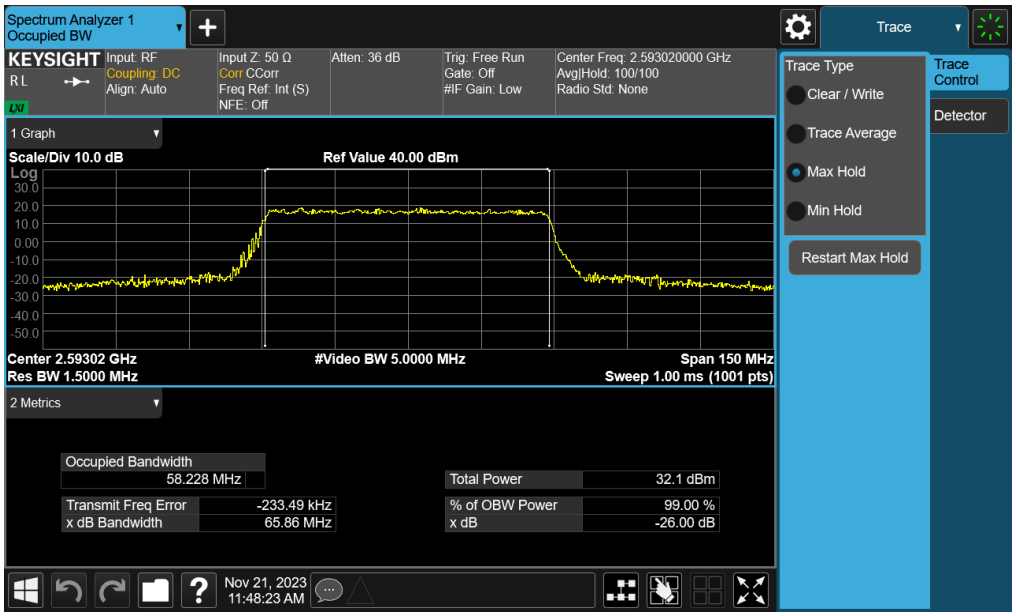


Plot 7-46. Occupied Bandwidth Plot (NR Band n41 - 70MHz 16-QAM - Full RB Configuration - Ant1)

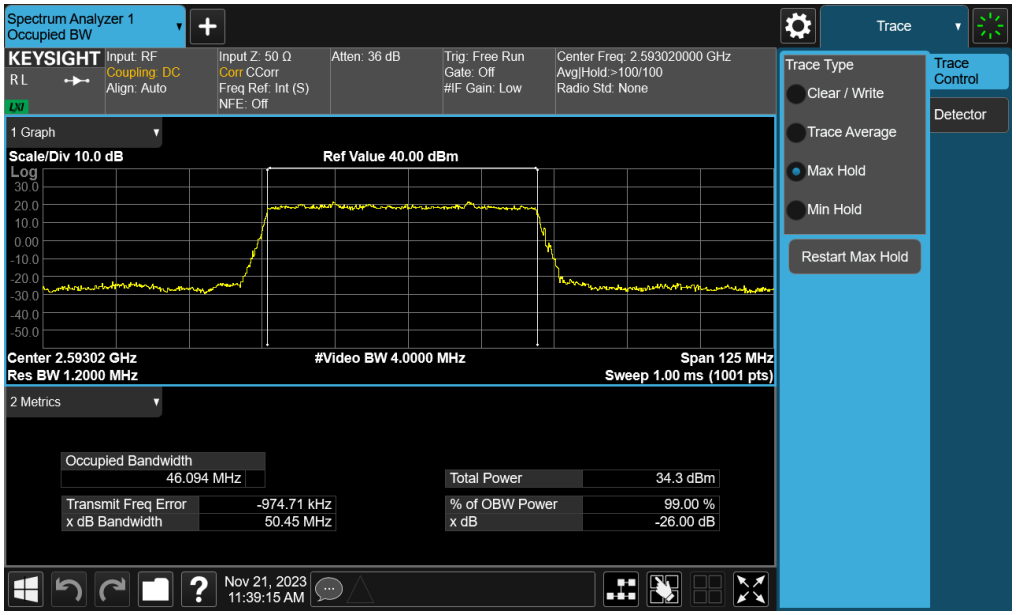
Plot 7-47. Occupied Bandwidth Plot (NR Band n41 - 60MHz π/2 BPSK - Full RB Configuration - Ant1)



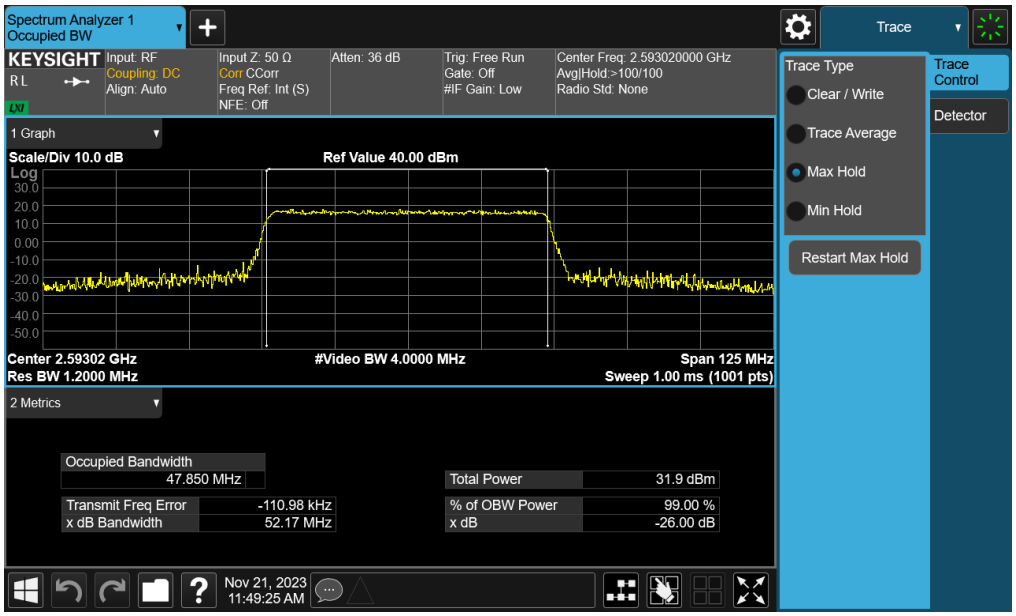
Plot 7-48. Occupied Bandwidth Plot (NR Band n41 - 60MHz QPSK - Full RB Configuration - Ant1)



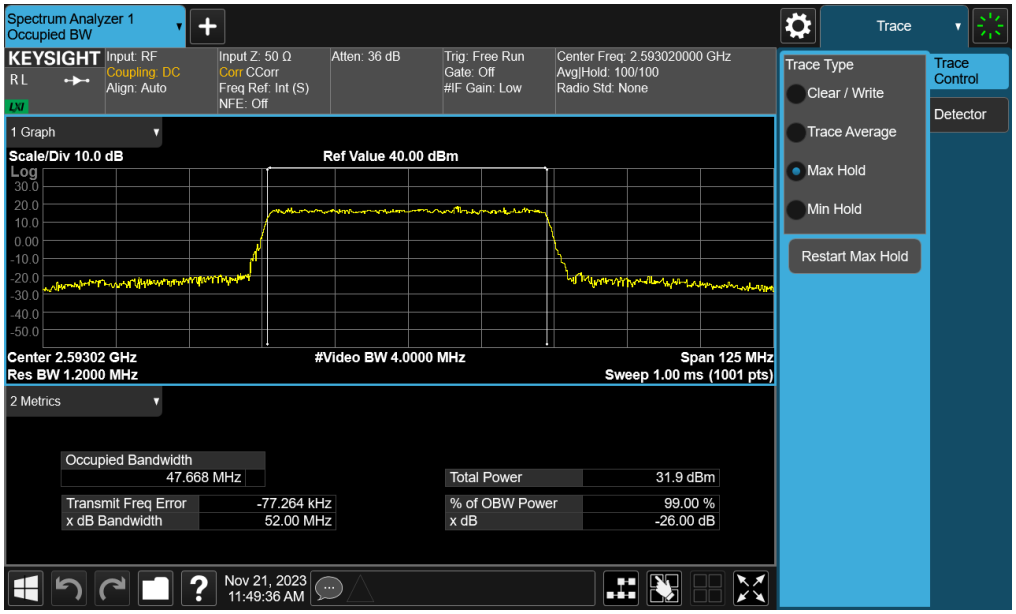
Plot 7-49. Occupied Bandwidth Plot (NR Band n41 - 60MHz 16-QAM - Full RB Configuration - Ant1)



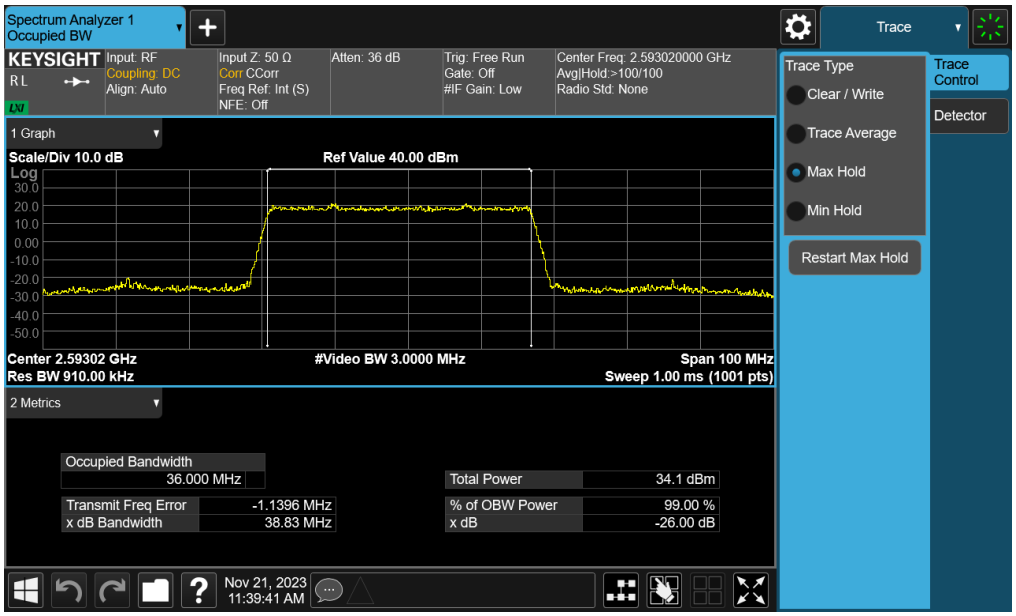
Plot 7-50. Occupied Bandwidth Plot (NR Band n41 - 50MHz π/2 BPSK - Full RB Configuration - Ant1)



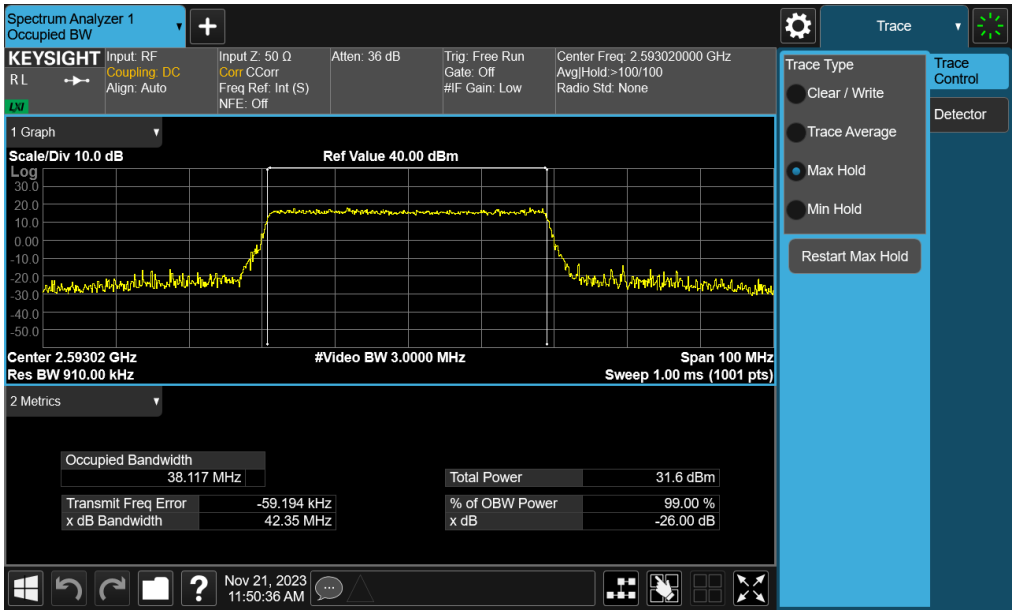
Plot 7-51. Occupied Bandwidth Plot (NR Band n41 - 50MHz QPSK - Full RB Configuration - Ant1)



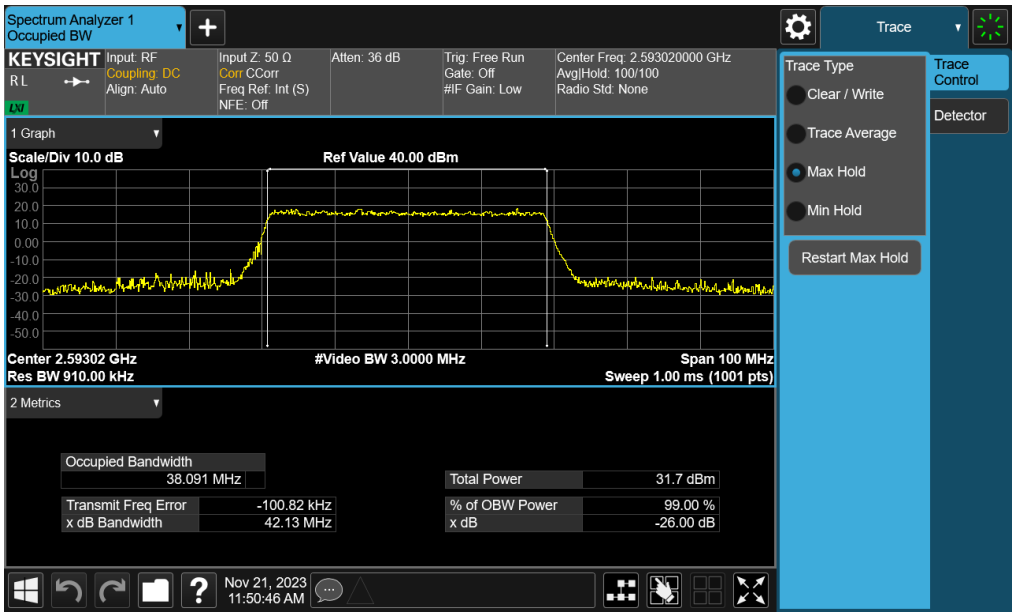
Plot 7-52. Occupied Bandwidth Plot (NR Band n41 - 50MHz 16-QAM - Full RB Configuration - Ant1)



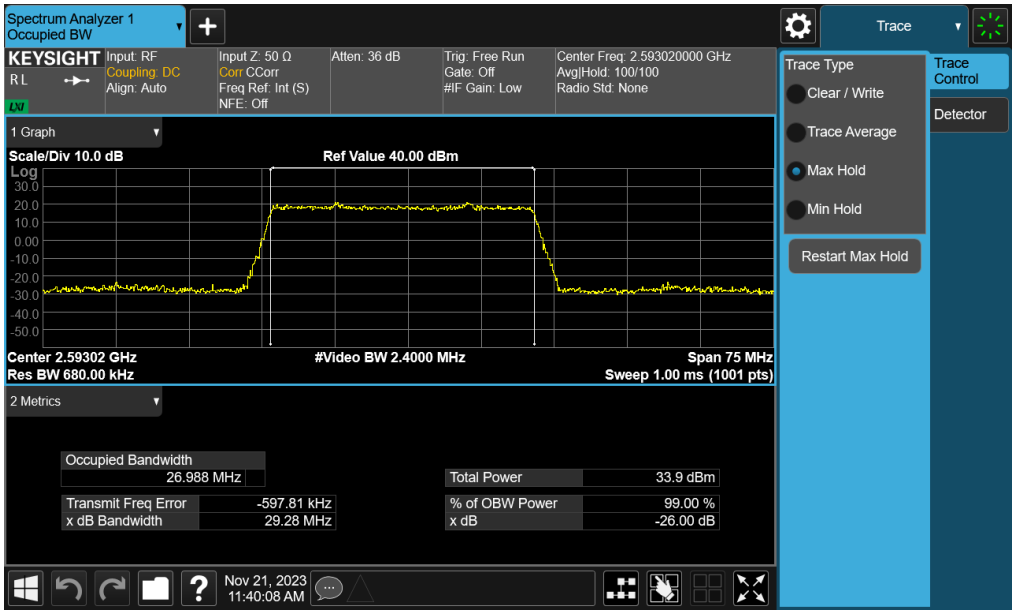
Plot 7-53. Occupied Bandwidth Plot (NR Band n41 - 40MHz π/2 BPSK - Full RB Configuration - Ant1)



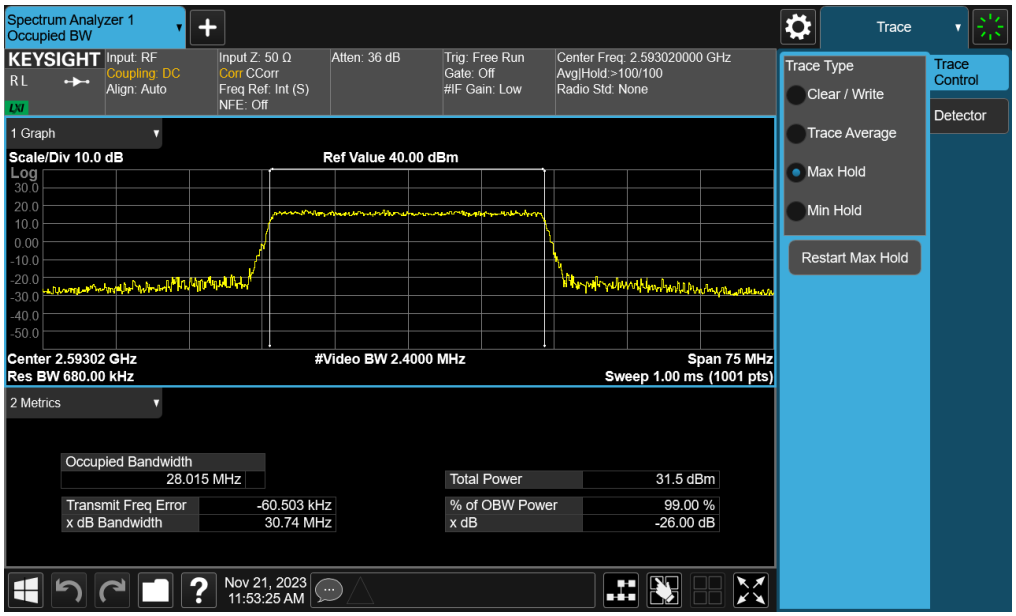
Plot 7-54. Occupied Bandwidth Plot (NR Band n41 - 40MHz QPSK - Full RB Configuration - Ant1)



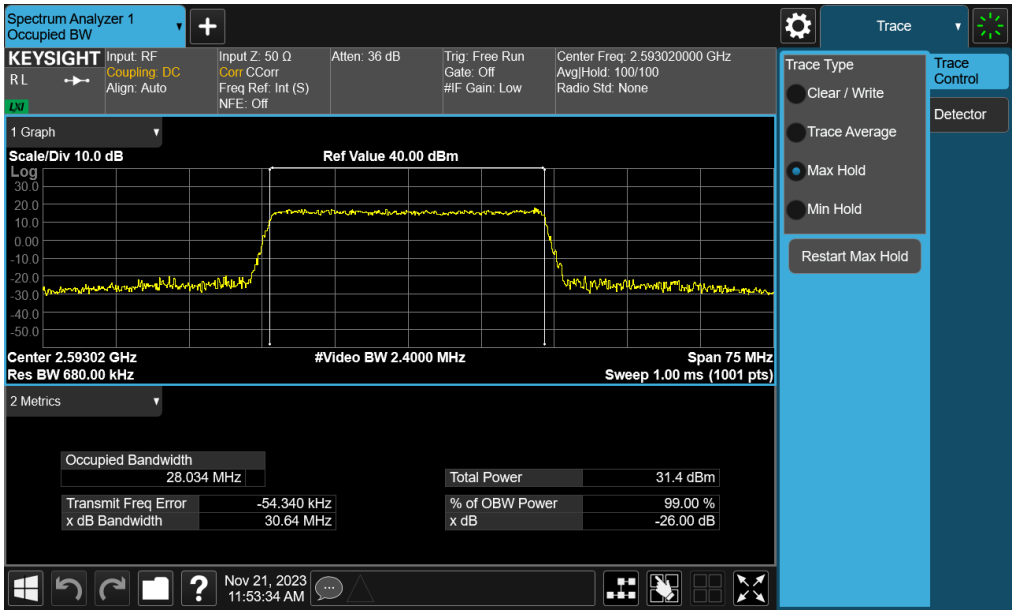
Plot 7-55. Occupied Bandwidth Plot (NR Band n41 - 40MHz 16-QAM - Full RB Configuration - Ant1)



Plot 7-56. Occupied Bandwidth Plot (NR Band n41 - 30MHz π/2 BPSK - Full RB Configuration - Ant1)

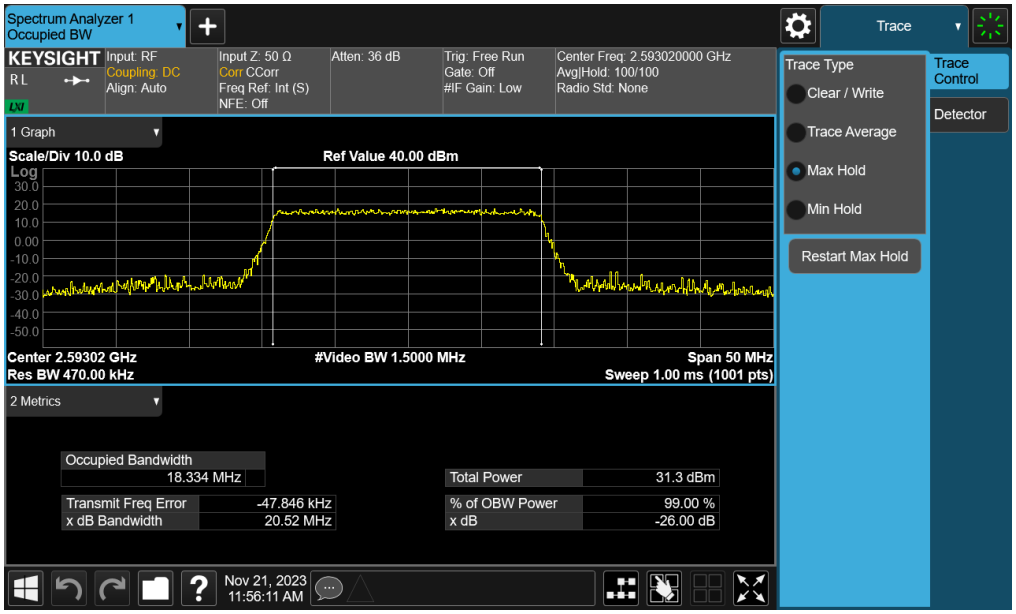


Plot 7-57. Occupied Bandwidth Plot (NR Band n41 - 30MHz QPSK - Full RB Configuration - Ant1)

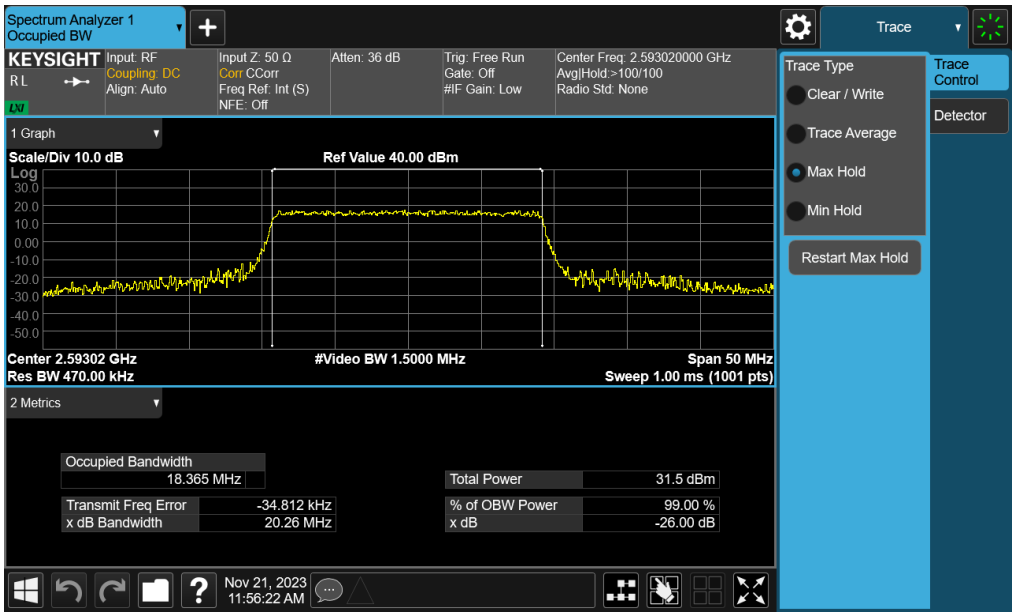


Plot 7-58. Occupied Bandwidth Plot (NR Band n41 - 30MHz 16-QAM - Full RB Configuration - Ant1)

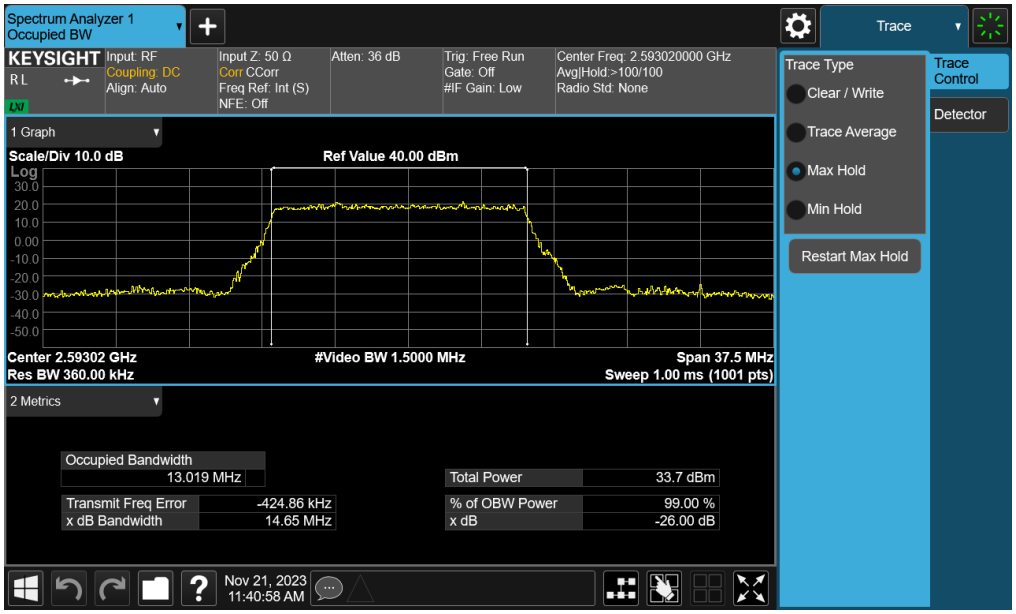
Plot 7-59. Occupied Bandwidth Plot (NR Band n41 - 20MHz π/2 BPSK - Full RB Configuration - Ant1)



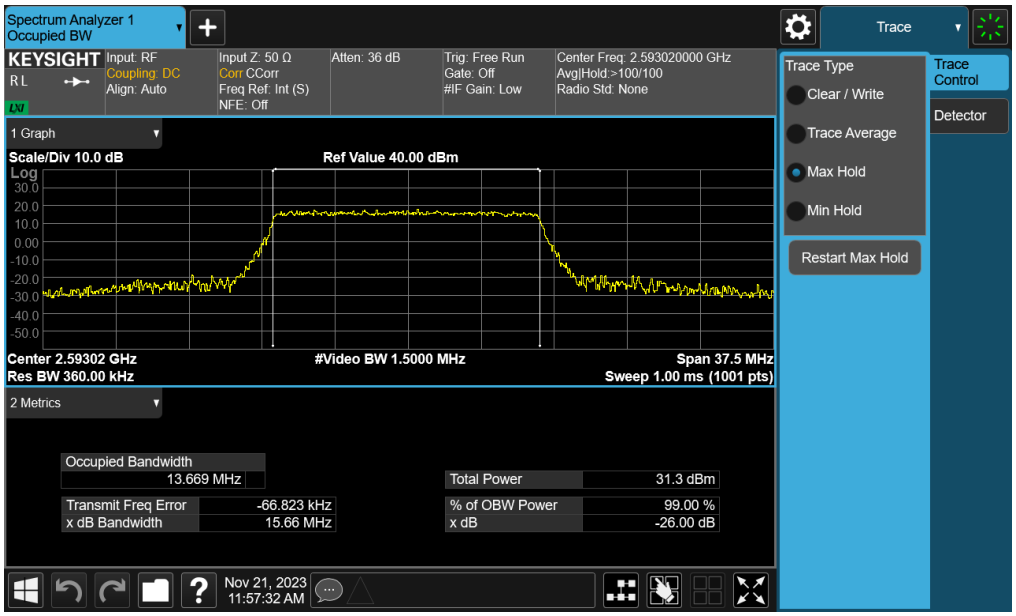
Plot 7-60. Occupied Bandwidth Plot (NR Band n41 - 20MHz QPSK - Full RB Configuration - Ant1)



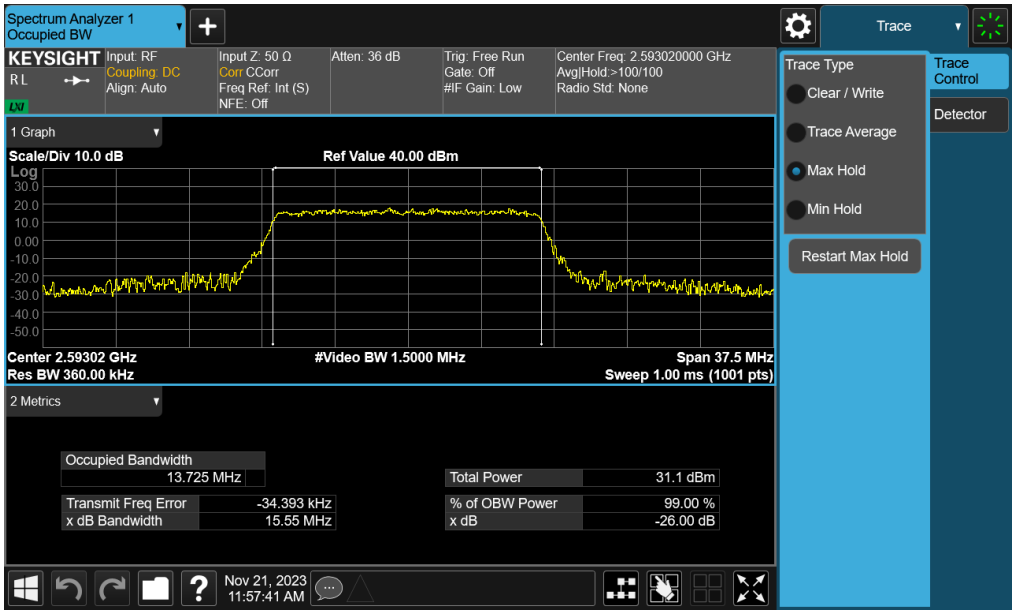
Plot 7-61. Occupied Bandwidth Plot (NR Band n41 - 20MHz 16-QAM - Full RB Configuration - Ant1)



Plot 7-62. Occupied Bandwidth Plot (NR Band n41 - 15MHz π/2 BPSK - Full RB Configuration - Ant1)

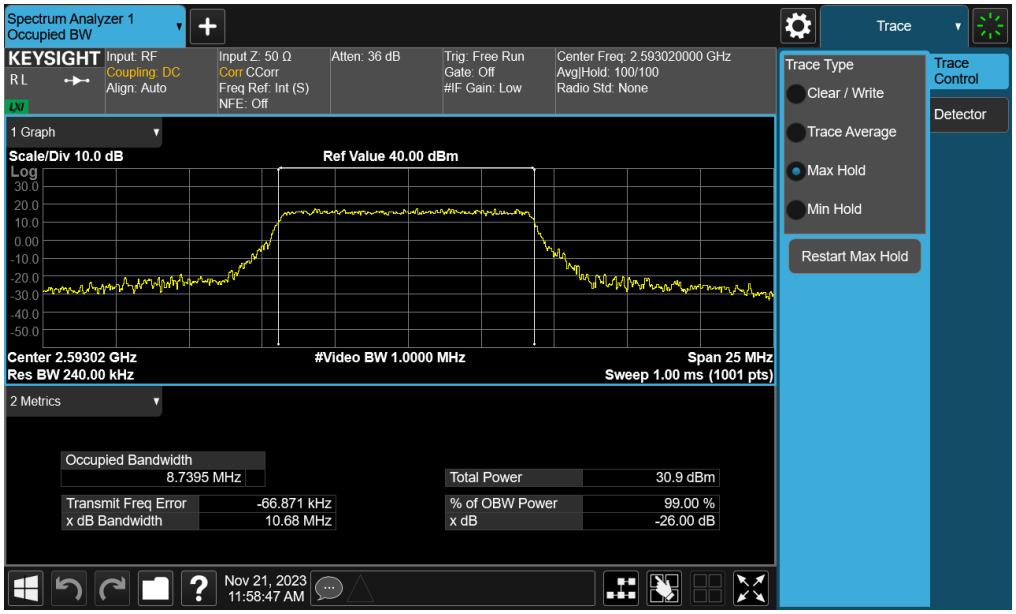


Plot 7-63. Occupied Bandwidth Plot (NR Band n41 - 15MHz QPSK - Full RB Configuration - Ant1)

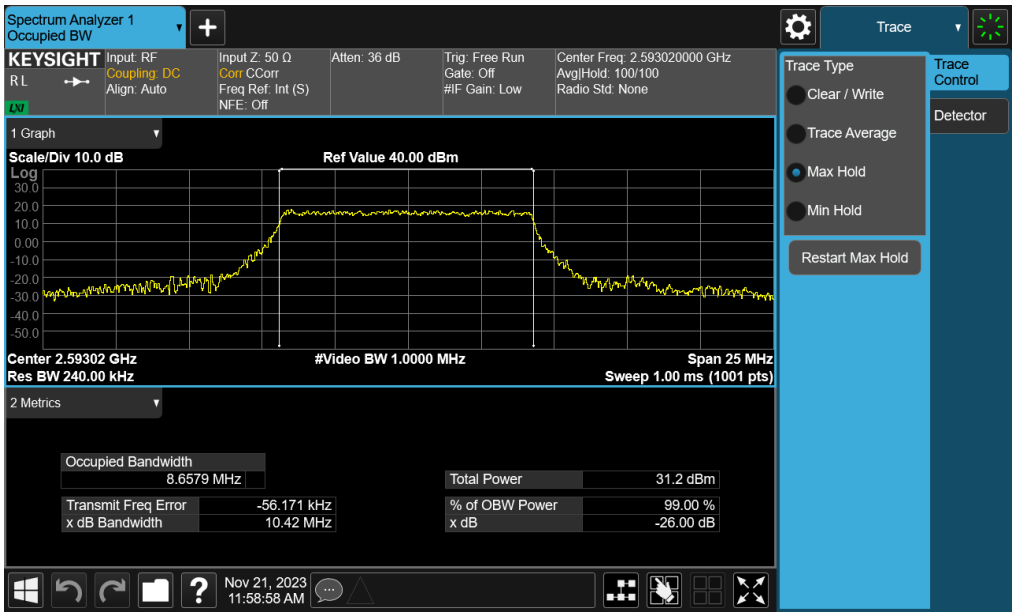


Plot 7-64. Occupied Bandwidth Plot (NR Band n41 - 15MHz 16-QAM - Full RB Configuration - Ant1)

Plot 7-65. Occupied Bandwidth Plot (NR Band n41 - 10MHz π/2 BPSK - Full RB Configuration - Ant1)



Plot 7-66. Occupied Bandwidth Plot (NR Band n41 - 10MHz QPSK - Full RB Configuration - Ant1)

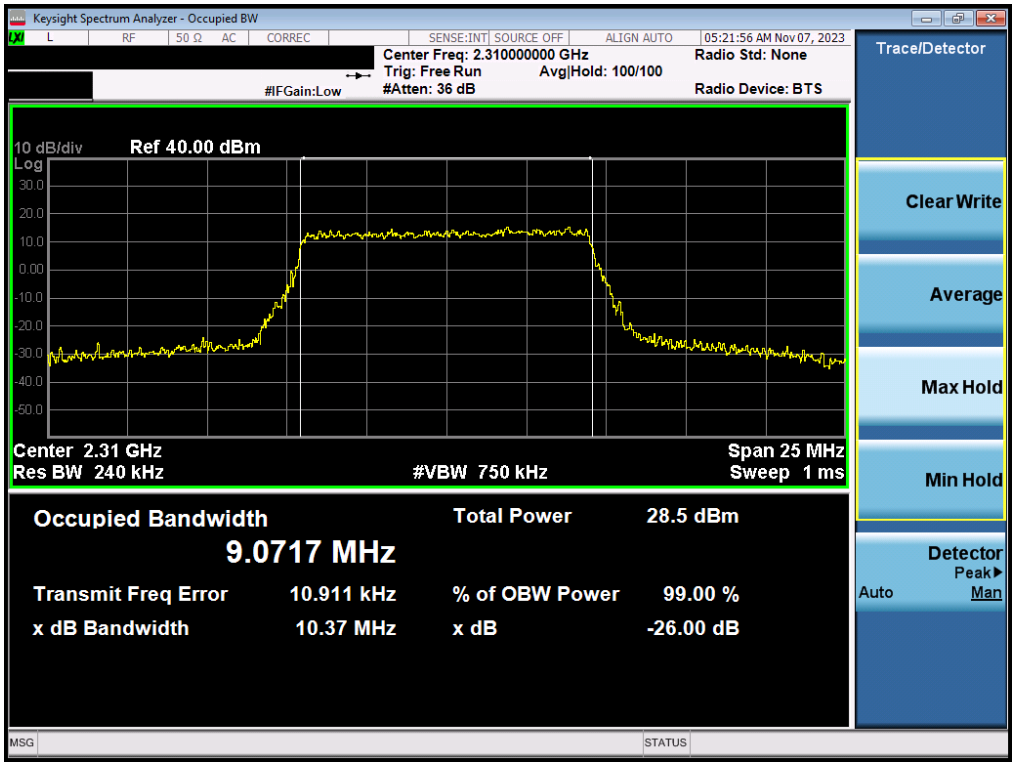


Plot 7-67. Occupied Bandwidth Plot (NR Band n41 - 10MHz 16-QAM - Full RB Configuration - Ant1)

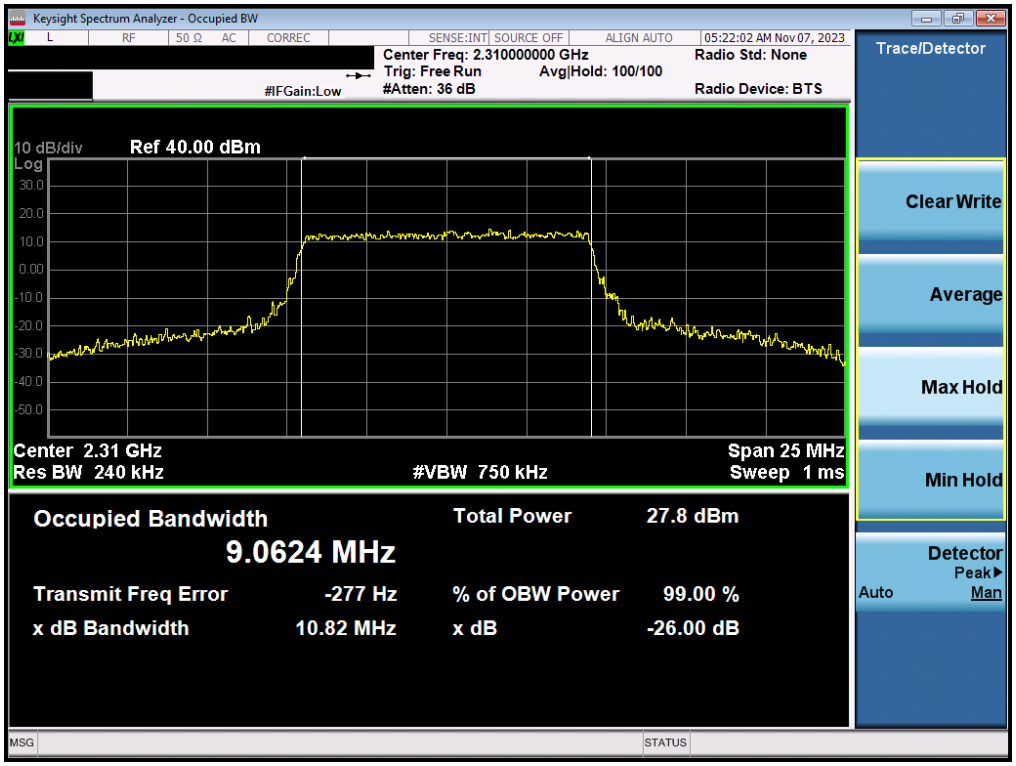
Mode	Bandwidth	Modulation	OBW [MHz]
LTE Band 30	10MHz	QPSK	9.07
		16QAM	9.06
	5 MHz	QPSK	4.55
		16QAM	4.55
LTE Band 7	20 MHz	QPSK	17.98
		16QAM	17.95
	15 MHz	QPSK	13.51
		16QAM	13.47
	10 MHz	QPSK	9.03
		16QAM	9.05
	5 MHz	QPSK	4.55
		16QAM	4.53
LTE Band 41(PC2)	20 MHz	QPSK	17.98
		16QAM	17.95
	15 MHz	QPSK	13.47
		16QAM	13.47
	10 MHz	QPSK	8.95
		16QAM	8.97
	5 MHz	QPSK	4.50
		16QAM	4.52
LTE Band 38	20 MHz	QPSK	17.95
		16QAM	17.97
	15 MHz	QPSK	13.45
		16QAM	13.50
	10 MHz	QPSK	9.02
		16QAM	9.01
	5 MHz	QPSK	4.55
		16QAM	4.52

Table 7-11. Occupied Bandwidth Result – LTE – Ant2

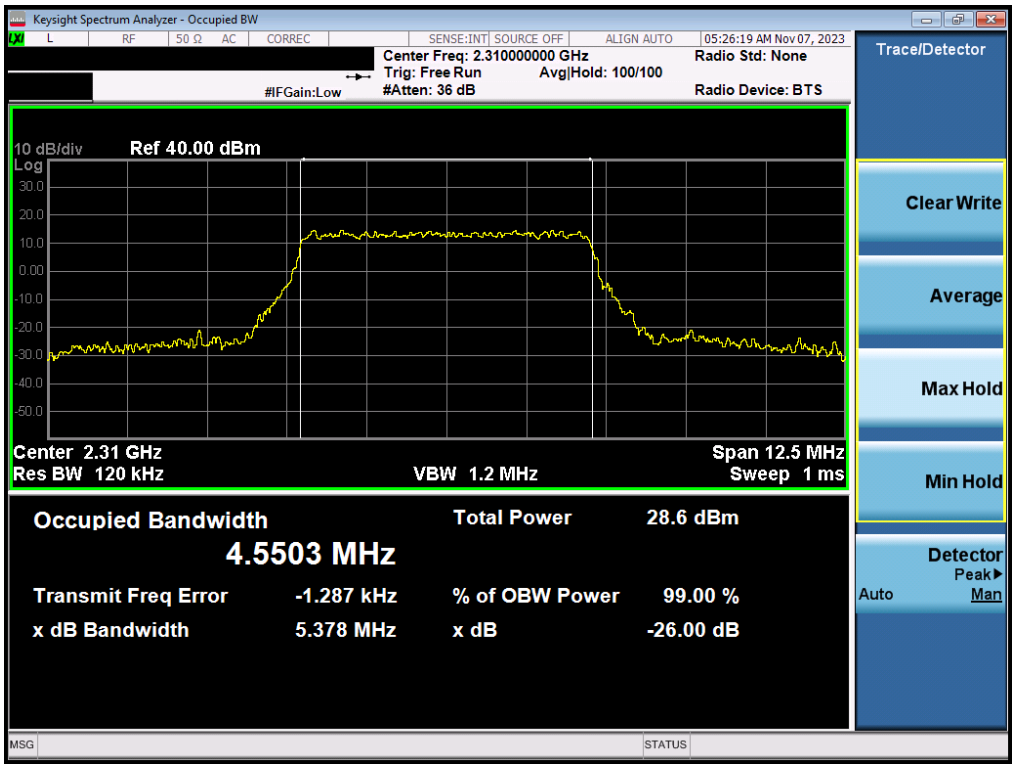
LTE Band 30 – Ant2



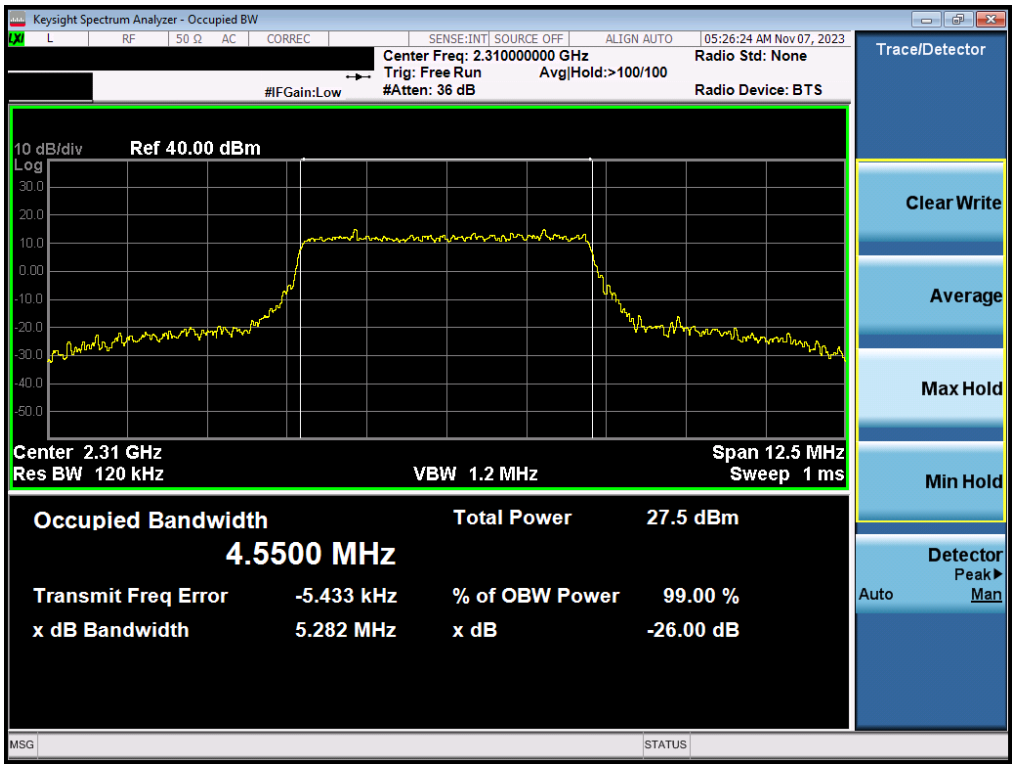
Plot 7-68. Occupied Bandwidth Plot (LTE Band 30 - 10MHz QPSK - Full RB - Ant2 – Ant2)



Plot 7-69. Occupied Bandwidth Plot (LTE Band 30 - 10MHz 16-QAM - Full RB - Ant2)

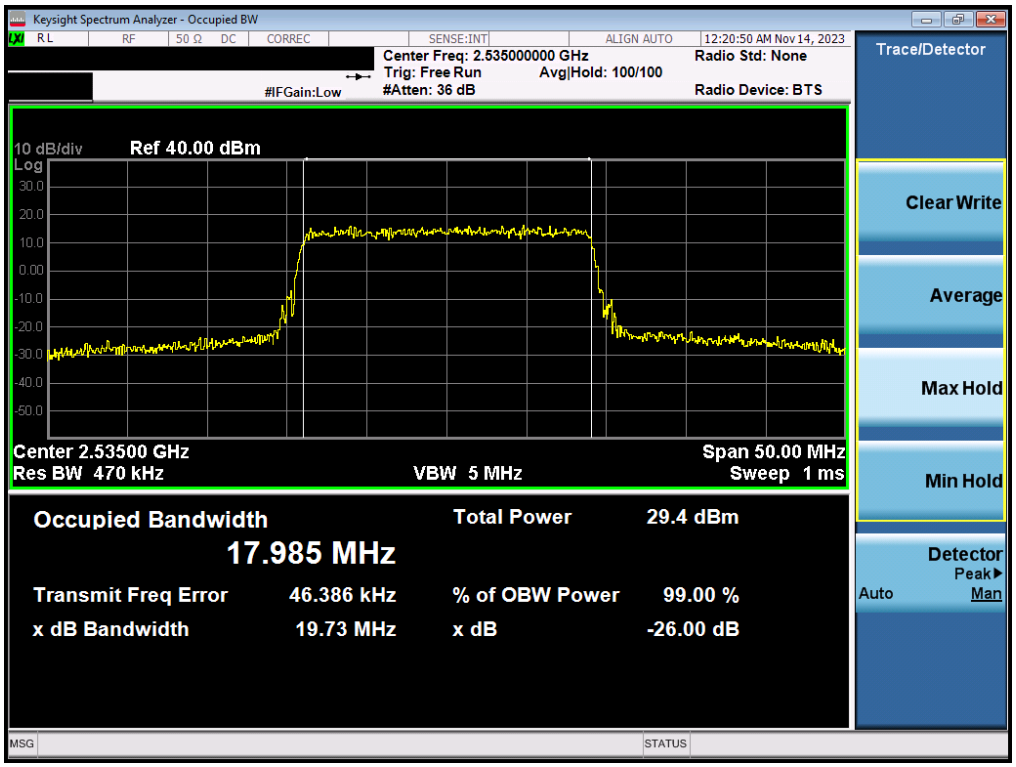


Plot 7-70. Occupied Bandwidth Plot (LTE Band 30 - 5MHz QPSK - Full RB - Ant2)

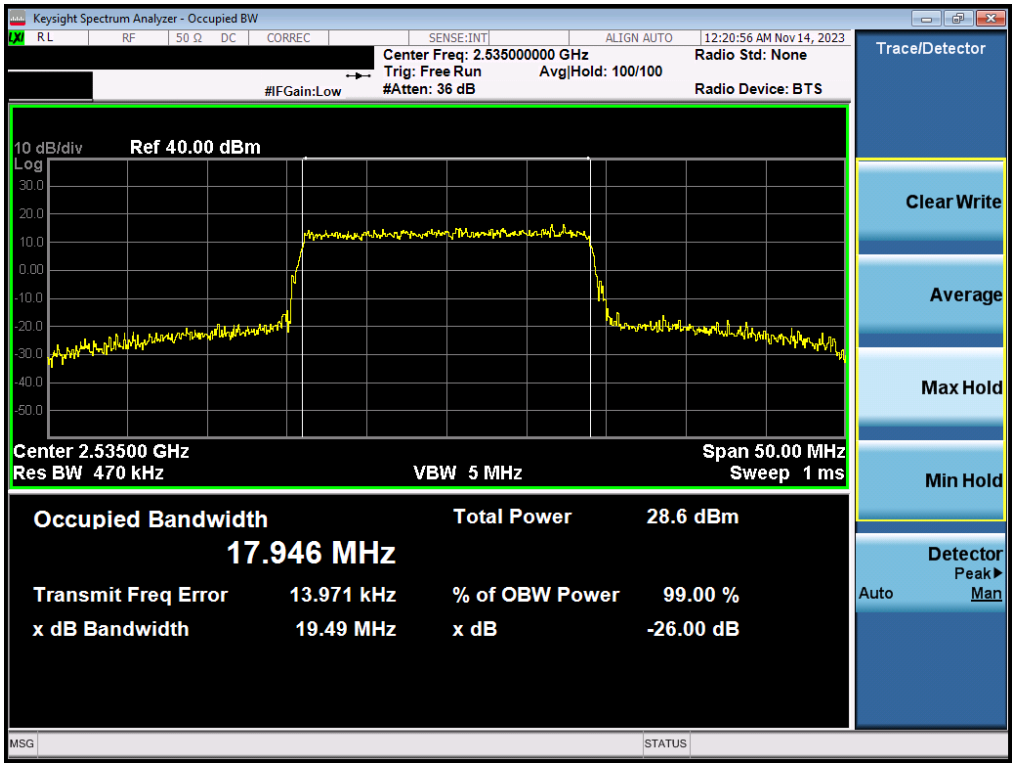


Plot 7-71. Occupied Bandwidth Plot (LTE Band 30 - 5MHz 16-QAM - Full RB - Ant2)

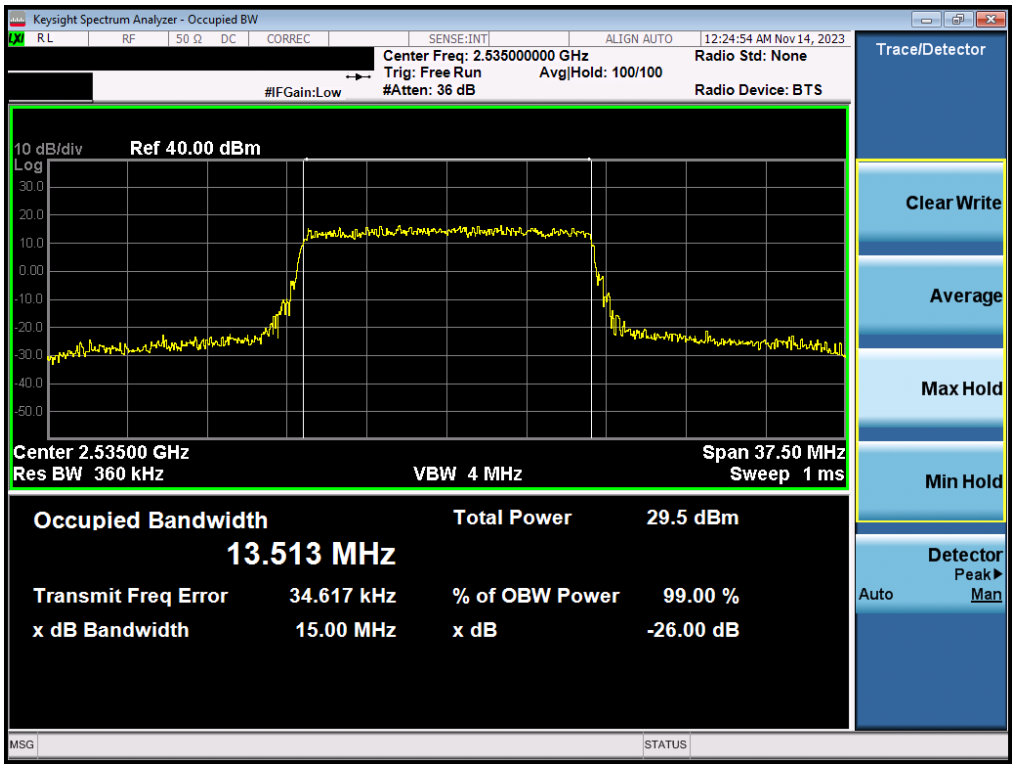
LTE Band 7 – Ant2



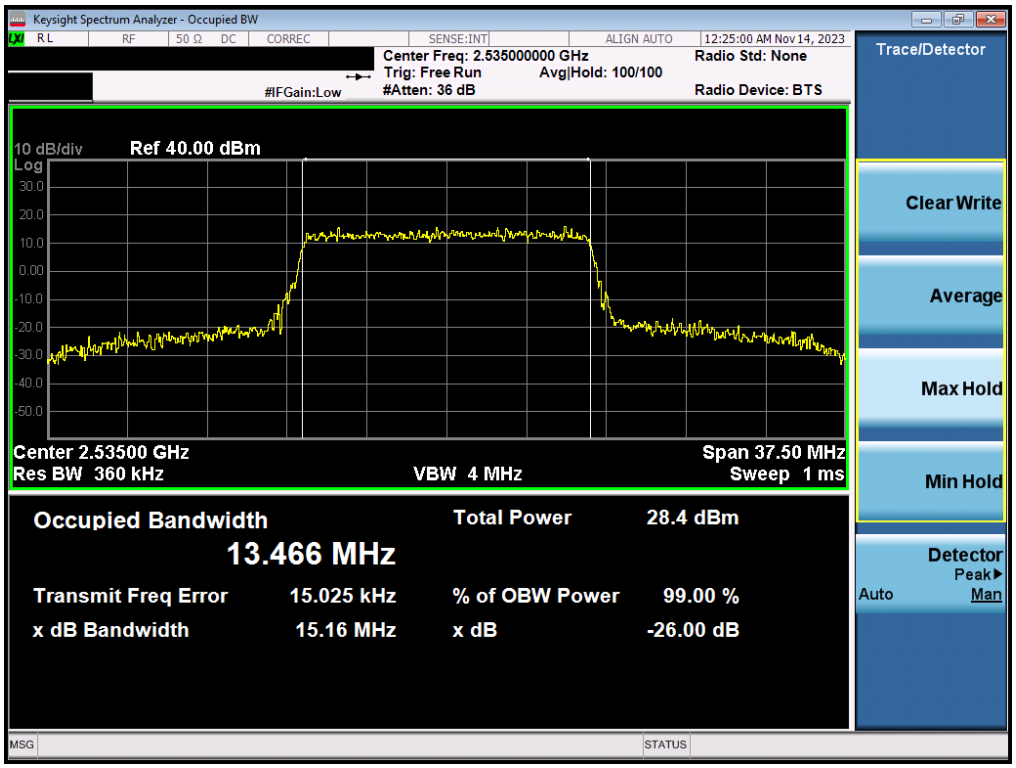
Plot 7-72. Occupied Bandwidth Plot (LTE Band 7 - 20MHz QPSK - Full RB - Ant2)



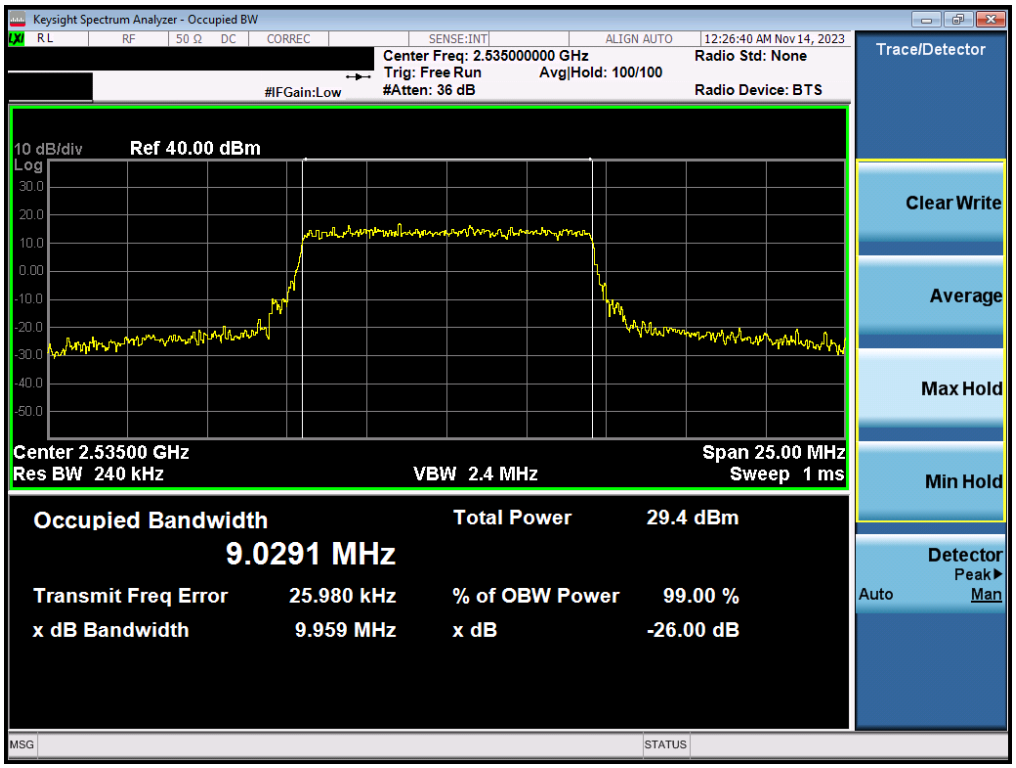
Plot 7-73. Occupied Bandwidth Plot (LTE Band 7 - 20MHz 16-QAM - Full RB - Ant2)



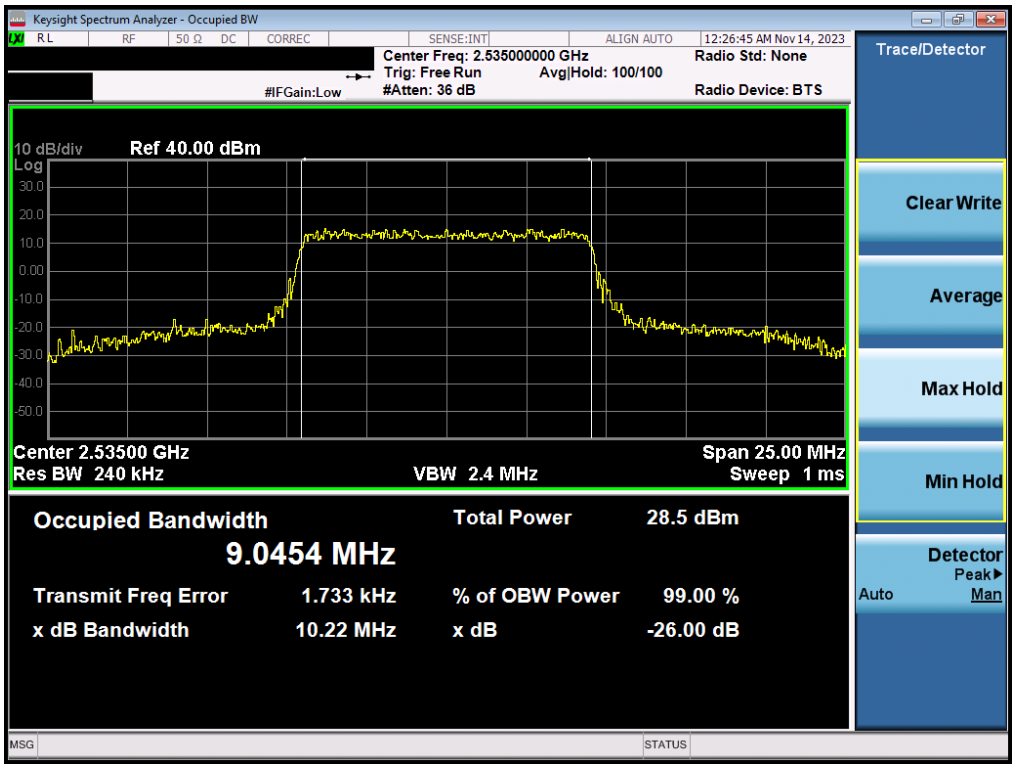
Plot 7-74. Occupied Bandwidth Plot (LTE Band 7 - 15MHz QPSK - Full RB - Ant2)



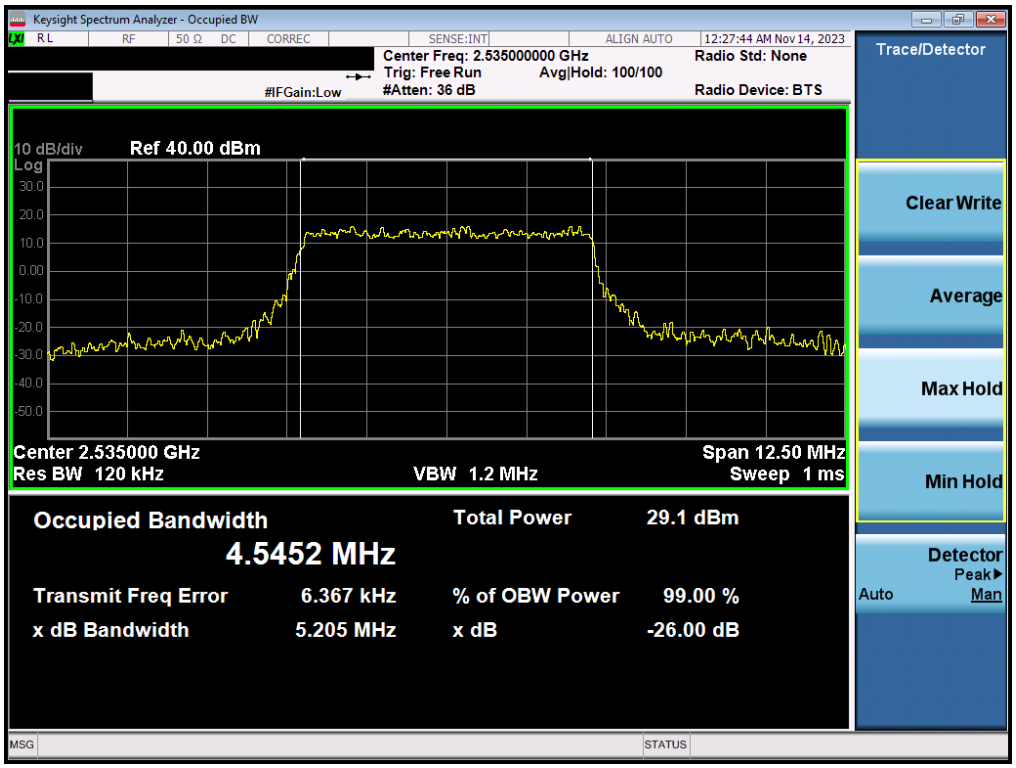
Plot 7-75. Occupied Bandwidth Plot (LTE Band 7 - 15MHz 16-QAM - Full RB - Ant2)



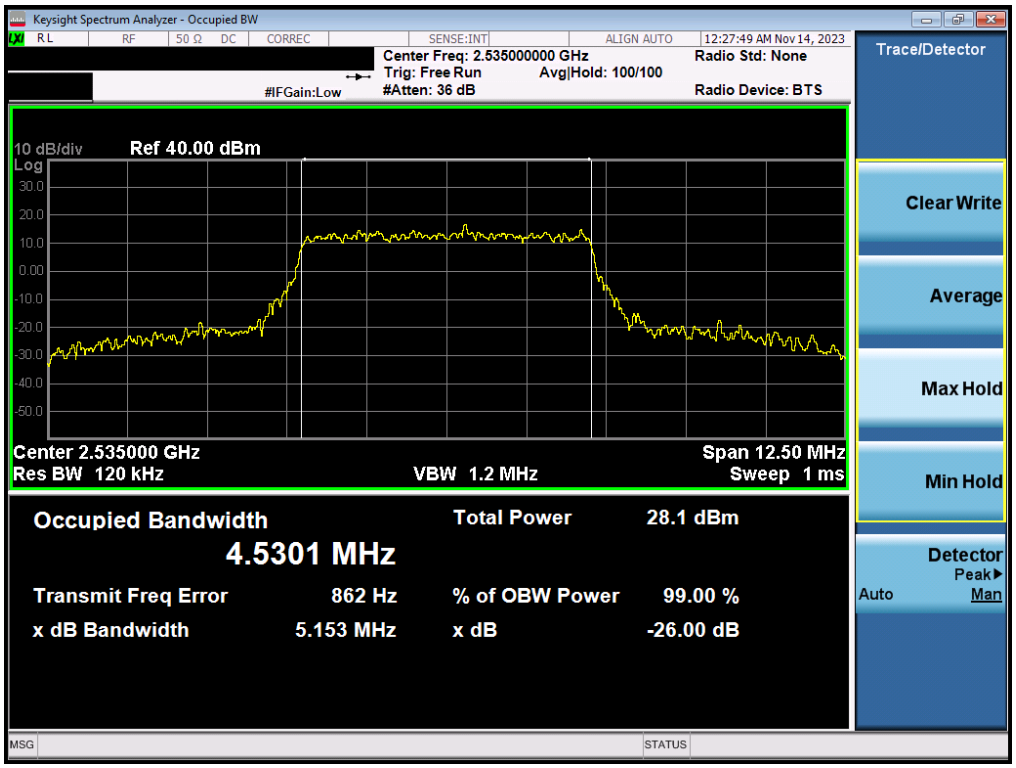
Plot 7-76. Occupied Bandwidth Plot (LTE Band 7 - 10MHz QPSK - Full RB - Ant2)



Plot 7-77. Occupied Bandwidth Plot (LTE Band 7 - 10MHz 16-QAM - Full RB - Ant2)

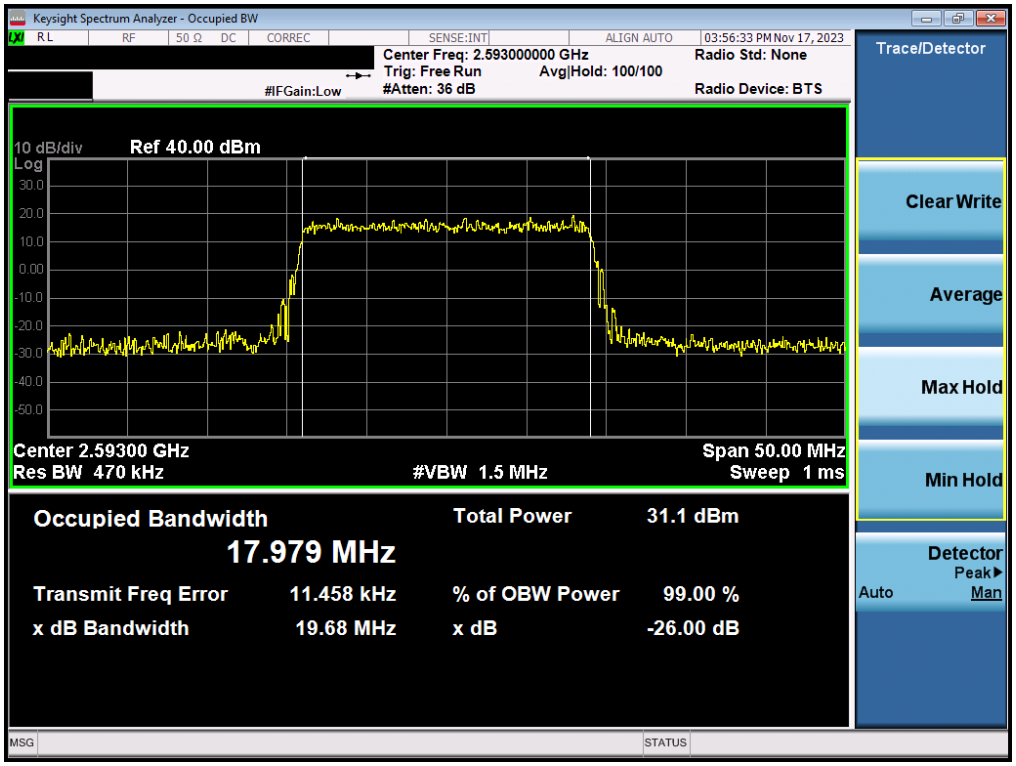


Plot 7-78. Occupied Bandwidth Plot (LTE Band 7 - 5MHz QPSK - Full RB - Ant2)

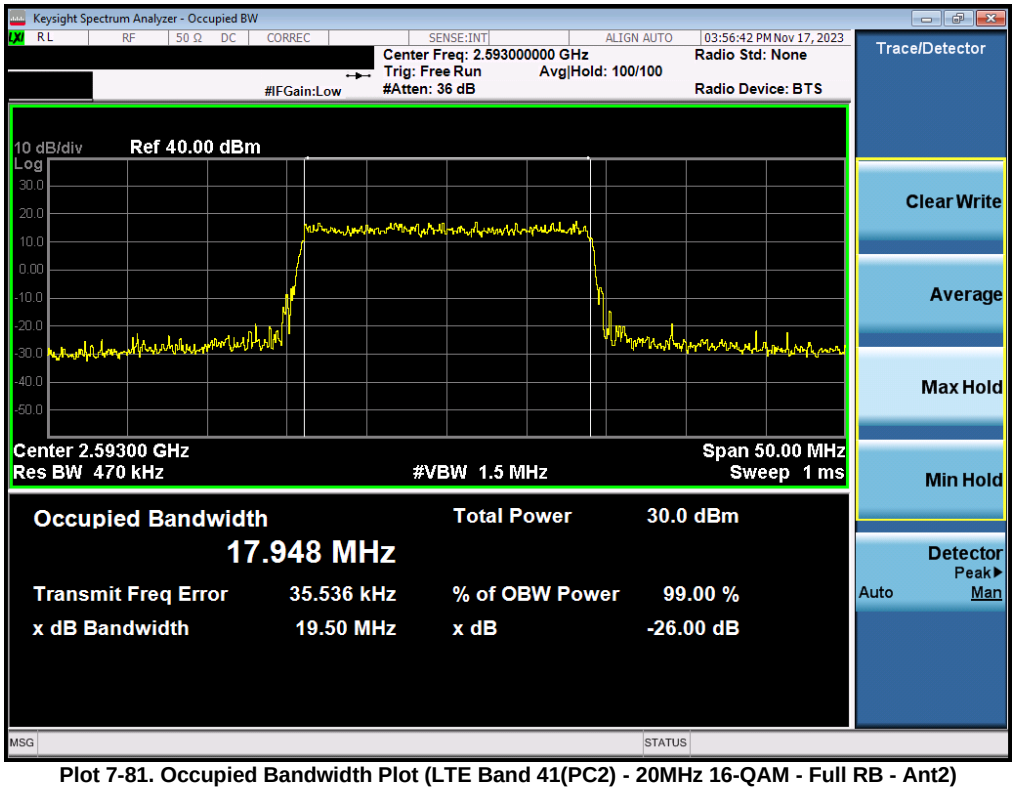


Plot 7-79. Occupied Bandwidth Plot (LTE Band 7 - 5MHz 16-QAM - Full RB - Ant2)

LTE Band 41(PC2) – Ant2



Plot 7-80. Occupied Bandwidth Plot (LTE Band 41(PC2) - 20MHz QPSK - Full RB - Ant2)



Plot 7-81. Occupied Bandwidth Plot (LTE Band 41(PC2) - 20MHz 16-QAM - Full RB - Ant2)